

Covering the TI99/4A and the Myarc 9640

# MICROpendium

Volume 6 Number 6

July 1989

\$2.00

## Four-Card solitaire in BASIC

★ ★ ★

## A better way to RESequence in XBASIC

★ ★ ★

## More on polynomials in c99



## The Portable TI — part 2

## USING OVERLAYS IN XBASIC

The conclusion of a five-part series



**THIS IS  
PAGEPRO  
FROM  
ASGARD**

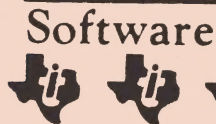
THE BOX ABOVE WAS CREATED BY  
LOADING THE PICTURE OF "CHIP"  
THEN TYPING THE TITLE USING  
THE "301-LG" FONT FROM ONE  
OF THE FONT DISKS. FINALLY I  
TYPED THE BORDER AROUND IT.  
TOTAL TIME WAS ONLY MINUTES.

## Review of Page Pro 99

### ALSO INSIDE

- ✓ Continuation of CHARAIFIX  
character generator
- ✓ User-supported software additions
- ✓ Make your speech synthesizer  
read D/V80 files
- ✓ Appointment Scheduler runs out  
of Myarc Advanced BASIC





# Choose from our big selection of software for the TI-99/4A Computer.

Tex Comp continues to stock the world's largest selection of TI Software. The TI Software library on module, disk and cassette and is considered the best in the home computer software field. TI utilized the talents of such industry leaders as Scott Forsman, Milton Bradley, Microsoft Corp., Scott Adams, Addison Wesley Publishing, DLM, Milliken Publishing, Scholastic Inc., Imagic, Spinnaker and the list goes on and on.

## Home Management, Personal Finance, Education, Arcade-type games — all in the big TI Computer software library.

Tex-Comp purchased TI's inventory of these outstanding titles in order to continue its support of the TI-99/4A user.

With its five warehouses and financial resources, Tex-Comp has been able to assure you, the TI-99/4A user continued support.

### HOME ENTERTAINMENT

MODULES	
PHM 3229	Hopper.....4.95
PHM 3023	Hunt The Wumpus.....4.95
PHM 3052	Tombston City.....4.95
PHM 3053	TI Invaders.....4.95
PHM 3054	Car Wars.....4.95
PHM 3057	Munch Man.....4.95
PHM 3056	Alpiner.....4.95
PHM 3112	Pearls.....4.95
PHM 3031	The Attack.....4.95
PHM 3194	Jawbreaker II.....5.95
PHM 3110	Chisholm Trail.....5.95
PHM 3034	Hustle.....6.95
PHM 3037	Hangman.....6.95
PHM 3025	Mind Challengers.....8.95
PHM 3036	Zero Zap.....8.95
PHM 3038	Connect Four.....8.95
PHM 3042D	Tunnels of Doom (with disk).....9.95
PHM 3042T	Tunnels of Doom (with tape).....9.95
PHM 3067	Othello.....9.95
PHM 3220	Microsurgeon.....9.95
PHM 3219	Super Demon Attack.....9.95
PHM 3222	Fathom.....9.95
PHM 3233	Burgertime.....9.95
PHM 3146	Munchmobile.....11.95
PHM 3197	Slymoids.....15.95

#### DISKETTE PROGRAMS

PHD 3002	TI-TREK (TE-II req. for speech).....4.95
PHD 3010	Mystery Melody.....4.95
PHD 5015	Oldies But Goodies I.....4.95
PHD 5017	Oldies But Goodies II.....4.95
***SPECIAL	Oldies But Goodies I & II.....7.95
PHD 3025	Sat. Night Bingo (Ex-Basic & Speech).....4.95
PHD 5037	Draw Poker (Ex-Basic).....4.95

#### CASSETTE PROGRAMS

PHT 6002	TI-TREK (TEII req. for speech).....4.95
PHT 6010	Mystery Melody.....4.95
PHT 6015	Oldies But Goodies I.....4.95
PHT 6017	Oldies But Goodies II.....4.95
***SPECIAL	Oldies But Goodies I & II.....7.95
PHT 6026	Sat. Night Bingo (Ex-Basic & Speech).....4.95
PHT 6037	Draw Poker (Ex-Basic).....4.95

#### ADVENTURES

PHM 3041D	Adventure Module & Pirate Adv. (disk).....6.95
PHM 3041T	Adventure Module & Pirate Adv. (tape).....6.95
ADVENTURE SERIES (must be used with PHM 3041 module)	
Specify disk or tape with order	
Adventureland.....	4.95
Mission Impossible.....	4.95
Voodoo Castle.....	4.95
The Count.....	4.95
Strange Odyssey.....	4.95
Mystery Fun House.....	4.95
Pyramid of Doom.....	4.95
Ghost Town.....	4.95
Savage Island I & II (two adventures).....	4.95
Golden Voyage.....	4.95
Knight Ironheart Adventure.....	4.95
***SPECIAL-ALL ABOVE ADVENTURES ON DISK OR TAPE---17.95	
Spiderman Adventure.....	4.95
Incredible Hulk Adventure.....	4.95
Buckaroo Banzai: Adventure (based on the movie).....	4.95
Sorcerer of Claymore Castle.....	4.95
***SPECIAL-ALL OF THE ABOVE FOUR + HINT BOOK + TWO NEW BONUS ADVENTURES.....	17.95
***SUPER ADVENTURE SPECIAL-BOTH OF THE ABOVE SPECIALS + COMPLETE HINT BOOK + ADVENTURE MODULE.....	29.95
PHM 3185	Return to Pirate's Island (self-contained adventure on module with graphics).....11.95

### COMPUTER PROGRAMMING AIDS

MODULES	
PHM 3026	Original TI Extended Basic.....39.95
PHM 3055	Editor-Assembler.....9.95
PHM 3036	Mini-Memory (with Writer II).....12.95
DISKETTE PROGRAMS	
PHD 5007	Teach Yourself 99/4A Basic.....4.95
PHD 5019	Teach Yourself Extended Basic.....4.95
PHD 5004	Programming Aids I.....4.95
PHD 5005	Programming Aids II.....4.95
PHD 5077	Programming Aids I, II, III.....9.95
PHD 5067	Beginning Basic Tutor.....4.95
PHD 5076	Text to Speech (Ex-Basic Speech).....4.95
PHD 5098	TI Forth & manual (Ed/Assem req.).....19.95
PHD 5078	TI Forth Demo Disk (Ed/Assem).....4.95
PHD 5079	TI Forth Source Code (2 disks).....4.95

#### CASSETTE PROGRAMS

PHT 6006	Programming Aids I.....4.95
PHT 6007	Teach Yourself 99/4A Basic.....4.95
PHT 6019	Teach Yourself Extended Basic.....4.95
PHT 6067	Beginning Basic Tutor.....4.95

### EDUCATION

MODULES	
PHM 3002	Early Learning Fun.....4.95
PHM 3003	Beginning Grammar.....4.95
PHM 3010	Physical Fitness.....4.95
PHM 3020	Musical Maker.....9.95
PHM 3004	Number Magic.....9.95
PHM 3021	Weight Control & Nutrition.....10.95
PHM 3109	TI Logo II (32K req.).....12.95
PHM 3015	Early Reading (speech syn req.).....9.95
PHM 3043	Reading Fun.....9.95
PHM 3046	Reading On.....9.95
PHM 3047	Reading Roundup.....9.95
PHM 3048	Reading Rally.....9.95
PHM 3087	Reading Flight.....9.95
PHM 3072	Weight & Subtraction I.....9.95
PHM 3078	Addition & Subtraction II.....9.95
PHM 3029	Multiplication.....9.95
PHM 3049	Division I.....9.95
PHM 3051	Numeration II.....9.95
PHM 3061	Scholastic Spelling 5 (speech).....9.95
PHM 3091	Milliken Subtraction.....9.95
PHM 3093	Milliken Division.....9.95
PHM 3094	Milliken Integers.....9.95
PHM 3096	Milliken Number Readiness.....4.95
PHM 3101	Milliken Laws of Arithmetic.....4.95
PHM 3114	Alligator Mix.....6.95
PHM 3115	Alien Addition.....6.95
PHM 3118	Minus Mission.....6.95
PHM 3177	Face Maker.....9.95
PHM 3178	Story Machine.....9.95

#### DISKETTE PROGRAMS

PHD 5009	Music Skills Trainer.....4.95
PHD 5011	Computer Music Box.....4.95
PHD 5018	Market Simulation.....4.95
PHD 5036	Speak & Spell II (Ex-Basic req.).....9.95
PHD 5031	Speak & Math (TE-II req.).....4.95
PHD 5062	Spell Writer (TE-II req.).....4.95
PHD 5026	Bridge Bidding I.....4.95
PHD 5039	Bridge Bidding II.....4.95
PHD 5041	Bridge Bidding III.....4.95
SPECIAL	BRIDGE BIDDING I, II, III.....9.95
PHD 5070	Music Maker Demo (use with module).....4.95
PHT 6010	Mystery Melody (stop the music quiz).....4.95

#### CASSETTE PROGRAMS\*

\*see disc. versions for requirements like TE-II

PHT 6009	Music Skills Trainer.....4.95
PHT 6010	Mystery Melody.....4.95
PHT 6011	Computer Music Box.....4.95
PHT 6018	Market Simulation.....4.95
PHT 6031	Speak & Math.....4.95
PHT 6042	Spell Writer.....4.95
PHT 6026	Bridge Bidding I.....4.95
PHT 6039	Bridge Bidding II.....4.95
PHT 6041	Bridge Bidding III.....4.95
SPECIAL	BRIDGE BIDDING I, II, III.....9.95
PHT 6020	Music Maker Demo (use with module).....4.95

### MANAGEMENT AND BUSINESS

MODULES	
PHM 3006	Home Financial Decisions.....4.95
PHM 3007	Household Budget Management.....4.95
PHM 3022	Personal.....4.95

PHM 3006	Home Financial Decisions.....4.95
PHM 3007	Household Budget Management.....4.95
PHM 3022	Personal Real Estate.....4.95
PHM 3016	Tax/Investment Rec. Keeping (disk req.).....4.95
PHM 3035	Terminal Emulator II.....9.95
PHM 3044	Personal Report Generator (PRA req.).....10.95
PHM 3113	Multiplication.....14.95
PHM 3112	TI Writer.....14.95
PHM 3013	Personal Record Keeping.....15.95

#### DISKETTE PROGRAMS

PHD 5001	Mailing List (upgraded version).....4.95
PHD 5003	Personal Financial Aids.....4.95
PHD 5021	Checkbook Manager.....4.95
PHD 5022	Finance Manager.....4.95
PHD 5024	Inventory Management.....4.95
PHD 5027	Invoice Management.....4.95
PHD 5029	Cash Management.....4.95
PHD 5038	Lease/Purchase Decisions.....4.95
PHD 5075	TI/Multiplication upgrade disk.....4.95

#### CASSETTE PROGRAMS

PHT 6003	Personal Financial Aids.....4.95
PHT 6038	Lease/Purchase Decisions.....4.95

### TI-COUNT BUSINESS SOFTWARE NEW LOW PRICE!

General Ledger.....	<b>SPECIAL OFFER!!!</b>
Accounts Receivable.....	<b>ALL SIX PROGRAMS</b>
Accounts Payable.....	<b>PLUS AUTO COUNT</b>
Inventory.....	<b>AUTO EXPENSE PROC</b>
Payroll.....	<b>RAM. . \$89.95+s&amp;h.</b>
Mail System.....	

### MATH AND ENGINEERING

specify disk or tape with order	
Math Routine Library.....	4.95
Electrical Engineering Library.....	4.95
Graphing Package.....	4.95
Structural Engineering Library.....	4.95
AC Circuit Analysis.....	4.95
****SPECIAL--ALL 5 OF THE ABOVE ON DISK OR TAPE---17.95	

TERMS: All prices FOB Los Angeles. For fastest service use cashiers check or money order. Add 3% shipping and handling (\$3.00 minimum). East of Mississippi, 4% (free shipping on all software orders over \$100.00). COD to be paid by cash or certified check. All TI products are sold with the original manufacturer's guarantee only, sent on request. Prices and availability subject to change without notice. We reserve the right to limit quantities.

NOTE: Payment in full must accompany all orders. Credit Card Company Check or Money Order for immediate shipment. Personal checks require up to 4 weeks to clear. California orders add 6% sales tax.

# TEX+COMP

America's Number One TI computer retailer

P.O. Box 33084, Granada Hills, CA 91344

VISA & MASTERCARD  
HOLDERS CALL DIRECT



(818) 366-6631

24 HOURS A DAY  
7 Days a Week!

# Super Savings

## Tex-Comp Proudly Presents Never Before Pricing On Essential Software Packages for the Texas Instruments Home Computer

As part of its program of long-term support for the TI-99/4A user, Tex-Comp has purchased truck-load quantities of original TI Software that is essential to the serious & dedicated user.

In turn, Tex-Comp is passing the savings on to **YOU!**

All TI Software in this advertisement is brand new, original TI Product in factory-sealed packages and is sold with a full Texas Instruments warranty, which TI has publicly committed to.

Now is the time to buy **Key Software** at a fraction of its original cost.

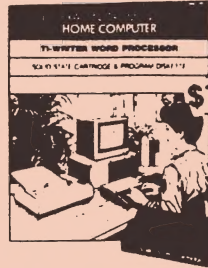
### There may never be a better time than now to buy



**\$14.95**  
+ S&H

#### TI Multi-Plan

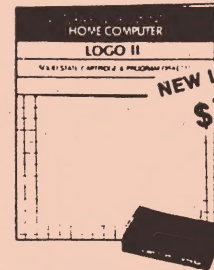
Electronic Worksheet with many advanced features and built-in ease of use. Requires disk drive and controller, and 32K memory Expansion Unit. Printer and RS-232 Interface recommended. Cartridge and Disk.



**\$14.95**  
+ S&H

#### TI Writer

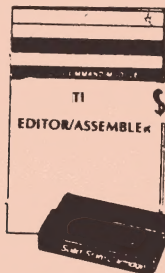
This is a professional word processing system for the TI-99/4A. Provides the features and ease of use found in office systems. Requires disk drive. 32K Memory and Printer. Module and Disk.



**NEW LOW PRICE!**  
**\$12.95**  
+ S&H

#### Logo II

In use by educators throughout the country. Requires cassette or disk based system and 32K memory expansion.



**\$9.95**  
+ S&H

#### Editor/Assembler

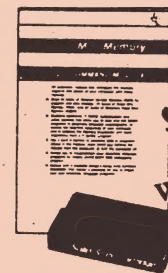
This is the complete version with manual, module, program disk and the disk version of Tombstone City as an example of assembly language programming. 32k and disk drive are required. This package will allow you to program the 99/4A in TMS 9900 Assembly Language and gives you access to all system features. Provides the fastest speed possible from the 16-bit processor!



**\$39.95**  
+ S&H

#### Original TI-Extended Basic Still the BEST for Less!

A powerful, high-level programming language that expands the capability of your TI-99/4A Home Computer. Includes TI Extended BASIC module (36K bytes of preprogrammed memory) and Owner's reference manual.



**\$12.95**  
+ S&H  
**WITH FREE Word Processing Bonus**

#### Mini-Memory

This software cartridge adds memory to your system. Totals 14K of memory (6K of GROM, 4K of ROM, 4K of RAM). Mini Memory includes a built-in battery, permitting programs and data stored in RAM to be retained even if module is removed from console.

**BONUS: FREE Mini-Writer I word processor (a \$19.95 value) with Mini-Memory Purchase.**

**SPECIALS:** SUPER EXTENDED BASIC.ExBasic + additional commands and graphics.....\$49.95  
EXTENDED BASIC II PLUS BY Mechatronic..ExBasic plus 44 K Bytes of preprogrammed memory plus graphics.\$44.95  
TI WRITER/MULTIPLAN UPGRADE DISK (with either)...\$ 1.00  
TI LOGO WORKBOOK (with LOGO).....\$ 1.00  
TEACH YOURSELF EXBASIC ON DISK (with any exbasic)\$ 1.00  
"INTRO TO ASSEM. LANGUAGE" (with Ed/Assem).....\$ 1.00  
TERMINAL EMULATOR II (reg 9.95) with any of above\$ 4.95

## TEX+COMP

America's Number One TI computer retailer

P.O. Box 33084, Granada Hills, CA 91344

VISA & MASTERCARD  
HOLDERS CALL DIRECT



**(818) 366-6631**  
**24 HOURS A DAY**  
**7 Days a Week!**

**TERMS:** All prices FOB Los Angeles. For fastest service use cashiers check or money order. Add 3% shipping and handling (\$3.00 minimum). East of Mississippi: 4% (free shipping on all software orders over \$100.00). COD to be paid by cash or certified check. All TI products are sold with the original manufacturer's guarantee only (sent on request). Prices and availability subject to change without notice. We reserve the right to limit quantities.

**NOTE:** Payment in full must accompany all orders. Credit Card Company Check or Money Order for immediate shipment. Personal checks require up to 4 weeks to clear. California orders add 6 1/2% sales tax.



# Contents

## MICROpendium

**MICROpendium (ISSN 10432299) is published monthly for \$20 per year by Burns-Koloen Communications Inc., 16606 Terrace Dr., Austin, TX 78728-1156. Second-class postage paid at Austin, Texas, and additional mailing offices. POSTMASTER: Send address changes to MICROpendium, P.O. Box 1343, Round Rock, TX 78680-1343.**

No information published in the pages of MICROpendium may be used without permission of the publisher. Only computer user groups that have exchange agreements with MICROpendium may excerpt articles appearing in MICROpendium without prior approval.

While all efforts are directed at providing factual and true information in published articles, the publisher cannot accept responsibility for errors that appear in advertising or text appearing in MICROpendium. The inclusion of brand names in text does not constitute an endorsement of any product by the publisher. Statements published by MICROpendium which reflect erroneously on individuals, products or companies will be corrected upon contacting the publisher.

Unless the author specifies, letters will be treated as unconditionally assigned for publication, copyright purposes and use in any other publication or brochure and are subject to MICROpendium's unrestricted right to edit and comment.

Display advertising deadlines and rates are available upon request.

All correspondence should be mailed to MICROpendium at P.O. Box 1343, Round Rock, TX 78680. We cannot take responsibility for unsolicited manuscripts but will give consideration to anything sent to the above address. Manuscripts will be returned only if a self-addressed stamped envelope is included.

Foreign subscriptions are \$25.25 (Mexico); \$27.50 (Canada) \$25.00, surface mail to other countries; \$37 airmail to other countries.

All editions of MICROpendium are mailed from the Round Rock (Texas) Post Office.

Mailing address: P.O. Box 1343, Round Rock TX 78680

Telephone: (512) 255-1512

CompuServe: 75156,3270  
Delphi TI NET: MICROPENDIUM  
Genie: J.Koloen

**John Koloen.....Publisher**  
**Laura Burns.....Editor**

## Regena on BASIC

Fourcard solitaire lets the computer deal and display the cards while you play.....Page 10

## Extended BASIC

What more flexibility when RESequencing? RESEQ2 puts in what TI left out of the RESequence command.....Page 13

## Trials of a c99 beginner

A program to calculate and plot up to 10 polynomials on a single graph.....Page 16

## The making of a portable TI

Part II in a series, making room for a RAMdisk.....Page 20

## Loaders, modular programs, linkages, overlays

The final installment in a 5-part series. Using overlays with Extended BASIC.....Page 30

## Character generator

More code for this assembly language program to define and save CHARA1 files on the TI and the Geneve.....Page 35

## Reviews

Page Pro 99.....Page 39

## Newsbytes

WINDYXB offered, Appointment Scheduler released for Myarc Advanced BASIC, and Texaments markets TI Sort.....Page 42

## User supported software

Zodiac Wheel of Fortune, Night Sniper and Japanese...Page 43

## User Notes

A program that reads D/V80 files through a speech synthesizer, fix for Archiver 3, Modulo division, and more.....Page 44

## Classified.....Page 46

### Programming conventions

Here are some tips to help you when entering programs from MICROpendium:

1. All BASIC and Extended BASIC programs are run through Checksum, the numbers that follow exclamation at the end of each program line. Do not enter these numbers or exclamation points. Checksum was published in the October 1987 edition.

2. Long XBASIC lines are entered by inputting until the screen stops accepting characters, pressing Enter, pressing FCTN REDO, cursoring to the end of the line and continuing input.



# Page Pro 99

*Page Pro 99* is the remarkable new page-making program for your TI-99/4A or Myarc Geneve that does something no other publishing program can claim - let you see the page on the screen exactly as it will appear on paper, before it is printed.

*Page Pro 99* is fast (written in assembly), easy to use (with on-screen prompts, a TI-Writer like editor, etc.), and powerful (with dozens of features, including many unique to this program). It will let you use standard TI-Artist pictures and fonts on your page. It will work on any system from a single drive 99/4A to a Geneve with hard disk drives. It includes thorough documentation. It is very dependable and well-tested (as it should be after 2 years of development). Finally, it produces beautiful pages.

Because it is "what-you-see-is-what-you-get" it is easy-to-use. Because it includes numerous examples, a good collection of starter fonts and pictures, and an in-depth tutorial you can use it straight out of the box. Because it is by Asgard Software, it has the support that it, and you deserve. Who can ask for more?

## PAGE PRO 99 TIMES

VOL. 1 NO. 1

SUMMER 1989

### PAGE PRO 99 RELEASED!

Rockville, MD—Asgard Software demonstrated its long awaited Page Pro 99 at a press conference today to thunderous applause. After the preliminaries, the President (and chief bottle-washer) of Asgard, Chris Bobbitt, ran the program through its paces. Spectators were impressed with the program's graphics capabilities (you can have up to 28 pictures of any size on a page at once), the ability to see the page on the screen before printing it, its ease-of-use (it's completely "what-you-see-is-what-you-get"), the multiple font features, and the line-drawing options.

Mr. Bobbitt did caution, "This isn't a full-scale desktop publisher, instead we like to call it a 'page-maker'", but most attendees felt the program would let the user do most anything that so-called desktop publishers could, and much more easily too. The general opinion from those who had a chance to use the program was that being able to see everything on the screen as it would appear on paper was a leap beyond anything else for the 99/4A or Geneve 9640.

When asked, attendees listed as reasons for purchasing the program many other things it offers including: the ability to use standard TI-Artist artwork, the ability to type in any direction, being able to print out the page at several dot densities, and also the ability to import TI-Writer files, were all mentioned. Reviewers also liked its Myarc HFDC and 9640 compatibility, and the general stability of the program (which users speculate was because of its lengthy testing period).

### Features:

Continued on Page 2

- Paste up to 28 pictures of any size on a page
- Type in one large font and one small font per page
- Two linestyles can be used at once
- Print out pages in single, double or "quad" density
- Type in any direction - up/down/left or right
- Includes utilities for converting TI-Artist fonts and instances, as well as creating two column text
- Import/Export TI-Writer files, save and load pages
- Geneve specific version included
- Use TI-Writer keys for editing text. Place pictures wherever the cursor is
- Requires 32K, Disk, Epson compatible printer.

I LIKE IT TOO!



### PROGRAM FEATURES

- 28 Pictures/page
- Large font and a small font on each page
- 2 linestyles/page
- See page on screen before printing
- Print in single, double or quad-densities
- Type up/down/left or right
- Import TI-Writer files
- Save/load page
- Uses TI-Artist Instances & Fonts
- And much more!
- Requires Disk, 32K XB or E/A modules

**\$27.95**

PLUS \$0.75 S&H  
 Canadians add \$0.50  
 Airmail add \$2.75

**ASGARD SOFTWARE**

**BOX 10306  
 ROCKVILLE,  
 MD 20850**  
 (703)255-3085  
 MASTERCARD/VISA

## Asgard Software

P.O. Box 10306  
 Rockville, MD 20850  
 (703)255-3085

**Only  
 \$24.95**

U.S. please add \$0.75 S&H  
 Canadians please add \$1.25 S&H  
 Europe/Asia/Australia  
 please add \$4.00 S&H



# Comments

## We just ran out of space

You will notice that this month we've got a number of very long articles. All of them are installments in different series. I don't think this has ever happened to us before, where we had have more than one ongoing series at the same time. The result is that we weren't able to publish the screen output version of the Calendar programs nor the Myarc Q&A column. Unfortunately, we weren't even able to conclude the CHARA1FIX program by Wayne Stith, which we started last month. We were able to devote five pages to the program, but that still leaves more than 300 lines of code left for next month. We will finish it next month.

### LOOKING AHEAD

In the next month or two we will be publishing a bare-bones terminal emulator program that supports XMODEM. We're going to do this because readers who use TEII, for example, can't download programs from many bulletin boards because TEII doesn't support XMODEM, a requirement for most boards. (CompuServe, GENie and Delphi, for example, all require XMODEM to download programs.) Readers may input this program, log onto a bulletin board and, using the XMODEM feature, download a full-featured terminal program, such as Telco or Fast-Term, and be on their way. Incidentally, the program is written in assembly language is is about 400 lines long.

Also coming next month will be the start of a series of short articles on the p-code system, an article on Forth in 80 columns, and the start of a two-parter on standardizing printer functions.

### ENCOURAGING MORE NEWSBYTES

This is directed at commercial and noncommercial software and hardware developers.

If you are trying to reach thousands of TI users, the best place to announce your products is in MICROpendium. There's no charge for a Newsbyte announcement, and we give this information a high priority. Announcements may be mailed to us, or posted to us on GENie, CompuServe or Delphi (our ID's are listed on Page 4).

We often get inquiries from readers about where to

obtain programs, particularly for Geneve programs. For those who distribute their programs by uploading them to bulletin boards, you should know that most of our readers do not belong to bulletin boards. In many cases, the only contact many of our readers have with the TI world is through MICROpendium. We encourage you to take a few minutes to drop us a line. If getting your product into the hands of users is important to you, you can't do better than by placing a free announcement in Newsbytes.

### GENEVE UPDATE

Advanced BASIC is nearing completion of the debugging process, thanks to beta testing by scores of Geneve users. The most recent version, in late June, had only minor problems. Apparently none of the remaining problems affects the operation of the program. The most recent version runs out of Ver. 0.95 of the hard disk version of MDOS. Ver. 0.95, incidentally, isn't compatible with Myarc Disk Manager 5.

Jim Uzzell has released the first program we've seen to run out of Advanced BASIC. Called Appointment Scheduler, it allows the user to create an appointment calendar covering an entire year. The cost is \$15. (See Newsbytes for details.)

### THE SOURCE IS NO MORE

The Source telecommunications service has been acquired by CompuServe. Source subscribers were notified in July of the situation. The transfer is effective as of Aug. 1. Source users received a \$20 credit for usage time on CompuServe as a result of the discontinuation of The Source.

Unlike CompuServe members who pay no minimum monthly fee, Source members have been required to pay a minimum monthly fee and, according to CompuServe, will continue to do so as CompuServe members. Source members can check with the Sysops (TI-FORUM) on CompuServe to clarify this.

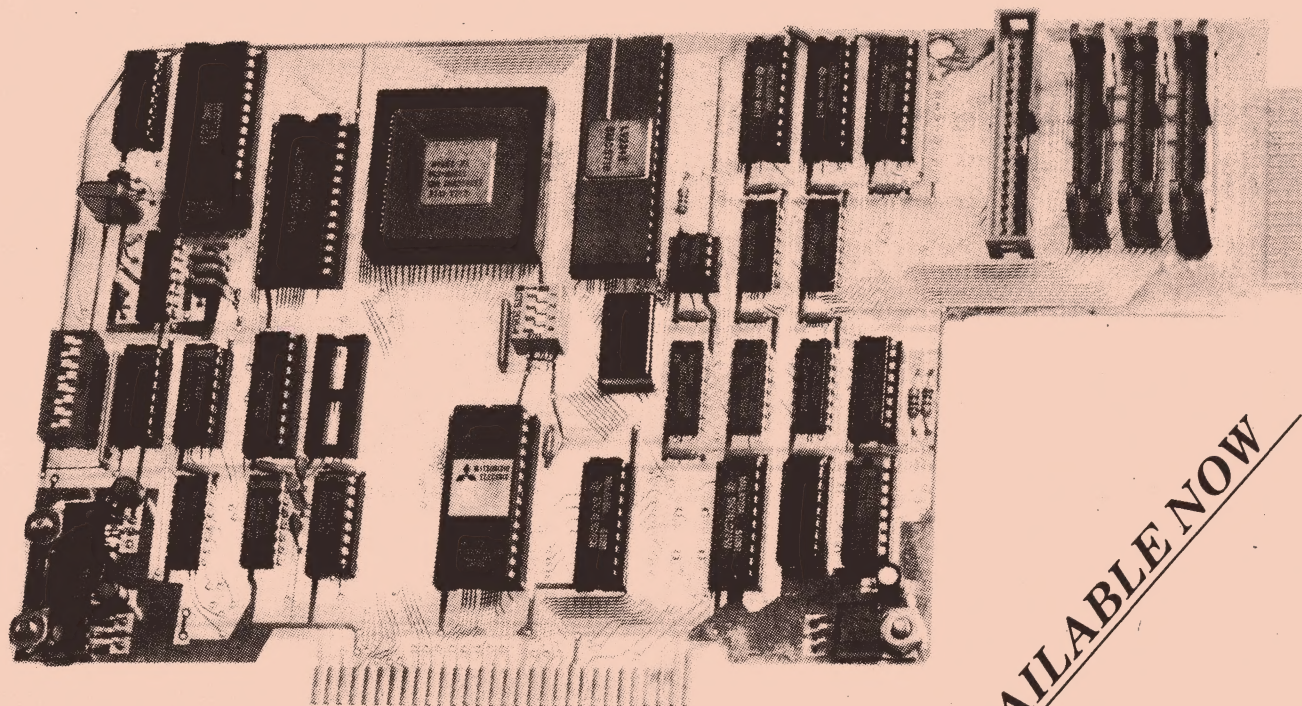
### DON'T EXPECT MORE TENEX CATALOGS

Aside from filling orders from its current catalogs, I don't expect to see any more catalogs of TI products from Tenex Computer Express.

—JK



# THE MYARC Hard & Floppy Disk Controller with Streamer Tape Backup Support



**AVAILABLE NOW**

## Features include:

- Hard drive transfer rate of 5Mbit per second, for speed comparable to an external RAM disk card
- Interfaces with standard, off the shelf, hard, floppy and streamer tape drives
- Built-in real time clock, for time and date stamping of files
- Supports up to four 5 1/4" and/or 3 1/2" floppy drives, mix or match
- All disk formats, SS/SD (90K), DS/DD (320/360K) and DS/QD (640/720K) supported
- MYARC Disk Manager V, the most intuitive and user friendly manager available
- One year limited warranty, 12 months parts, 6 months labor, is standard, an optional two, three or four year extended warranty is available



# Feedback

## NX-1000 problems

As a followup on my article (March 1989) I have found from reading several newsletters and from experience with the problems of a local user group member that some TI99/4A owners are having trouble with their NX-1000 printers.

It appears that the later versions of the NX-1000 are not compatible with the TI99/4A because of a problem in an EPROM chip in the printer. Although the self test works fine and the printer appears to operate with other computers, nothing is printed from the TI99/4A. The problem seems to be in just certain versions of the printers' EPROM. One version I have found to be bad is version 1.5. My NX-1000 has a version 1.31 and works fine.

The version number is printed when the self test is performed and is also written on the EPROM itself, which is located next to the dip switches under the cover. From what I have been able to determine, Star is providing free of charge an updated EPROM to correct this problem.

Many computer stores are authorized Star repair centers. Otherwise, you must call Star Technical Support at 1-900-860-9104. The charge for calling this 900 number is \$2 for the first minute and \$1 for each additional minute, according to what I was told when I called the 800 number. In calling the 800 number (800-537-8270), I was told that the 800 number is for authorized service centers only. Their old technical number is disconnected, and, in calling their general information number (714-768-7203) I was told that I must call the 900 number if I want service!

Anyway, I thought I would pass this information along in case some TI owners are having similar trouble with their NX-1000s.

**Gary Cox**  
President, Mid-South 99 User Group  
Memphis, Tennessee

## Thanks for help

I want to send thanks for all the replies I received for my letter to Reader to Reader (May 1989). Of course everyone will be receiving a personal thanks by return letter.

I want to mention that part of my letter dealing with copying single-sided disk to double-sided disk was solved by information received from C. Morrison of Worcester, Massachusetts. He put me on to Quick-Copier II, from Quality 99 Software at 1884 Columbia Rd. #1021, Washington, DC 20009-5161, telephone number (202) 667-3574. This program will copy disks and maintain the format of the target disk. It does a full single disk in only three passes; the instructions say it will do it in two passes with Mini-Memory, but I cannot get it to load with that cartridge. I use Extended BASIC. It sells for \$9.95 plus \$4.50 handling. It is a time saver for me.

**Ray Russell**  
Weatherford, Texas

## Geographical basis for Myarc support?

Letters in support of Myarc support, published in MICROpendium, have one thing in common — all — *all* — are from the USA. The initial complaint which triggered this pro-Myarc avalanche came from Canada.

I am aware of similar complaints from Sweden and Australia. Overseas supporters are having a bad time of it.

Perhaps MICROpendium can obtain letters of support for Myarc from outside the USA?

**Stephen Shaw**  
Stockport, England

## Mail problem

I desperately need the help of the TI community. Would anyone who has sent me a donation for my 1989 Valentine after Feb. 28 who has still not received a reply from me, please immediately send me a letter, clearly stating the following information:

1. Name and current address (including country, if not in the USA).
2. The exact date, or close approximation, when originally mailed.
3. Amount of donation.
4. Manner in which it was sent (cash, check or money order).
5. Address to which the donation was sent (if known).

6. If a letter containing a donation was returned to the sender, please include the original envelope (if the sender still has it).

The post office is aware that some mail is either being mishandled or stolen and is investigating claims.

Upon receiving a letter with the above information in it, I will immediately mail a post card back, acknowledging receipt. Mail sent directly to my new address (below) has not been affected by this situation and will reach me with no difficulty.

Persons assisting with this investigation will not be called on to testify in the event this case results in an arrest.

**Ray Kazmer**  
8614 Foothill Blvd., #221  
Sunland, CA 91040

## Program listings and chess

Just a few lines in response (albeit a little late) to your statement about program listings in MICROpendium printed via the 24-pin dot matrix printer instead of the old way; I sure appreciate the better legibility of this newer way, as I used to bypass typing in programs from the old format even if I badly wanted to make use of them — just couldn't decipher some tops and tails with accuracy previously. Good show!

Also, your mention of a chess program for the 4A, based on the Sargon algorithm — I've been mystified as to why no such program was developed for us beyond what Texas Instruments put out. Certainly such a game shouldn't be ignored by programmers — a jewel among games of logic, a veritable evergreen with worldwide recognition for centuries. It's been a real shame. At least Asgard helped out some with its Beyond Video Chess, which benefits players immensely in enabling them to use disk I/O of games and to use joysticks in comfort rather than keyboard only. But I hope that if there is such a program for the TI that it will be much more powerful than the one TI put out in its module. That item had a lot of bells and whistles that could have been eliminated to give us a much stronger program, which is what chess lovers really enjoy.

**Charles Poulin**  
Euclid, Ohio



# TI INTERNATIONAL EXPO 89

Sponsored by Mid-Atlantic Ninety-Niners

Saturday, September 16, 1989

**VENDORS — USER GROUPS — DEMOS — SPEECHES — NEW PRODUCTS  
ALL FOR THE 99/4A AND 9640 COMPUTERS.**

Howard Johnson Inn  
5821 Richmond Highway  
Alexandria, Virginia  
703-329-1400

Show Time: 9:00 am — 5:00 pm  
Pre-show reception: 6:00 pm Friday  
Buffet: 6:00 pm Saturday

General Admission: \$4.00  
Advance Sales: \$3.00  
Buffet, advance sales: \$15.00

Vendor Booth Rates: \$50.00 first table  
\$15.00 each additional table  
Contact us for additional details.

## SPEND A FAMILY VACATION IN THE BEAUTIFUL NATION'S CAPITAL

Hotel Rates: \$55.00 + tax. Avoid a sell out! You must reserve your room by August 25 to obtain the special show rates. Call Howard Johnson now! International attendees, contact us directly.

Call or write for additional details, vendor information or advance sales:

\* **TI International Expo 89, P.O. Box 4005, Rockville, MD 20850**

**Call the EXPO 89 Info Line: 301-340-7179**

**Delphi: TELEDATA - CIS 74405,1207**

## ★ ★ ★ TI NET ★ ★ ★

The Texas Instruments International Network

**WE DON'T JUST "SUPPORT" THE 99/4A AND 9640 GENEVE  
WE ARE THE SUPPORT FOR YOUR SYSTEM!!**

<b>COMPARE COSTS:</b>	<b>DELPHI</b>	<b>CompuServe #</b>	<b>GEnie +</b>
1200 baud	\$7.20/4.80*	\$12.50	\$6.00
2400 baud	\$7.20/4.80*	\$12.50	\$10.00
Canada nodes	\$7.20/4.80**	None	\$13.20/14.40 + +

- \* \$4.80 — Advantage plan rate
- \*\* In most major Canadian cities, U.S. Dollars. Advantage plan available
- # CompuServe Surcharge, add \$1.50/mo. Network charges included - .50/hr
- + Some remote access cities have an additional \$2.00/hr. surcharge.
- + + GEnie 1200/2400 baud charges

All costs are per hour during non-prime connect time.  
Delphi Available on the Tymnet and Telenet networks

### THE FEATURES!

TI NET has the usual Databases, Message areas and Conference facilities but TI NET has much more the others just don't have!

- \* Electronic Shopping — features online purchasing for your system.
- \* Interactive Polling — allows you to voice your opinions.
- \* Classified Advertising — Interactive ads to sell used products.
- \* Online Graphics — supported by the TELCO program.
- \* Protocols — YMODEM support for faster up/down loads.
- \* Surcharge Software — Pays you \$\$ for software uploaded you designate
- \* Magazine ordering — Order 99/4A and 9640 magazines online.
- \* Much more than space can permit!

### UNANSWERED QUESTIONS?

You won't have any as a member of TI NET. If your 99/4A or 9640 related question can't be answered on TI NET, it can't be answered at all!

Communicate directly with the designers and developers of many of the 99/4A and 9640 products you use daily.

### IT'S GUARANTEED!!

Join by August 1, 1989 — leave one question concerning ANY aspect of your system or software by August 31, 1989, and it's guaranteed you'll receive a reply to your question. If not, you'll receive one FREE hour of standard connect time on TI NET when you let the System Manager know.

### ONLINE SIGN UP OFFER

Dial **1-800-365-4636** or **617-576-2981**  
Press Return twice. At PASSWORD, type TISPECIAL and press Return. From Canada: dial direct. At USERNAME type JOINDELPHI and Return.

**Delphi: General Videotex Corp. TI NET: P.O. Box 244  
3 Blackstone St. Lorton VA 22079  
Cambridge, MA 02139**



## BASIC

# It's time for fourcard solitaire

By REGENA

It's time for another solitaire card game. This month's program is written in TI BASIC for the card game "Fourcard." The computer is used to deal the cards randomly and display the cards. The computer does not allow you to make an illegal move.

Four cards are dealt face up at the top of four columns. The object of the game is to discard or move cards as more cards are dealt so that eventually the four aces are at the tops of the columns. Only four cards are "playable" at any time — the cards showing completely at the bottoms of the columns.

The asterisk at the top of the column indicates which bottom card you want to select. Use the arrow keys (S and D without pressing the FCTN key) to move the asterisk left or right. When any of the cards showing have matching suits, you may discard or remove the card(s) with the lower numerical value. Ace is high. To discard, move the asterisk over the appropriate column, then press the down arrow key (X without FCTN). The card will be removed, and if there are more cards in that column, the new bottom card will now show.

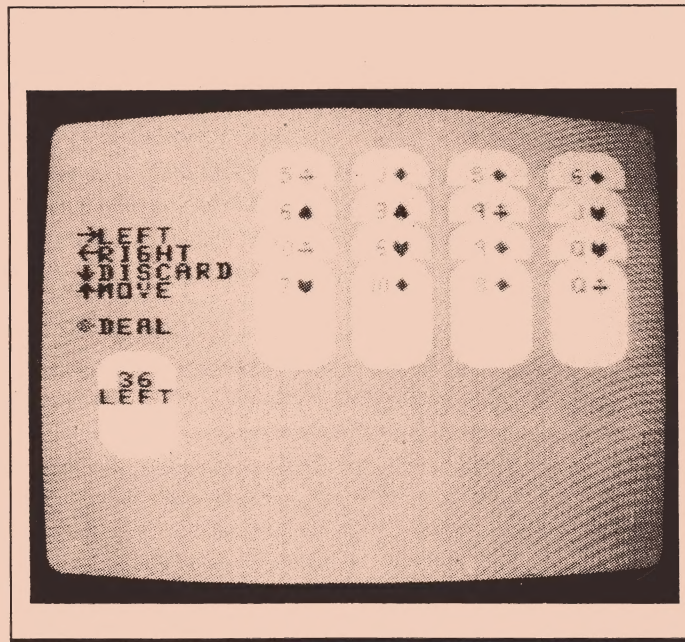
If you remove cards in the top row, a blank space will be created (an empty column). Any other bottom card may be moved to that top vacant space. Move the asterisk above the column you want — the one with the card you want moved — and press the top arrow key (E without FCTN). The card will move from the bottom of the column selected to the space in the top row.

When you have discarded or moved all the cards you can, press the ENTER key to deal four more new cards. Continue the process of discarding, moving and dealing, and try to get all the aces to the top row. When all four aces are in the top row, press ENTER and the game ends. If you try to deal more than nine rows of cards in any column, the game will end as a loss. The card deck on the left of the screen indicates how many cards are left in the deck to be dealt.

As you play the game you will learn different strategies. For example, you may not always want to move the ace to the top spot immediately — another move may free two cards of the same suit and allow discarding more cards before moving the ace up. I have been able to get the four aces in place with 20 cards left in the deck (lucky shuffle). Have fun trying to beat that!

## EXPLANATION OF THE PROGRAM

Line 120 DIMensions arrays used in the program. CARD(52) are the possible 52 cards in the deck. T(r,c,1) is the suit of the card in row r and column c. T(r,c,2) is the number of the card in row



r and column c. R(4) keeps track of which row in each of the four columns has the playable card.

Lines 130-480 print the title screen and brief instructions while graphic characters and colors are defined. Remember, if you have trouble running the program, the most likely place for a typing error is in the DATA statements of Lines 410-470. These lines define graphic characters for the cards and numbers and suits on the cards.

Lines 480-500 wait for you to press the ENTER key before starting the game. Line 510 clears the screen, then Lines 520-610 initialize variables for "shuffling" the cards and starting a new game.

Lines 480-500 wait for you to press the ENTER key before starting the game. Line 510 clears the screen, then Lines 520-610 initialize variables for "shuffling" the cards and starting a new game.

Lines 620-730 clear the screen then print the playing screen with the reminder arrows and the deck showing how many cards are left to be dealt. Lines 740-830 deal the first four cards. The variables J and K are used as coordinates of the top left corner of a card for drawing or removing a card.

Line 840 starts with A=1, where A designates the number of the column indicated by the asterisk. AA is the graphics column coordinate corresponding to A. Lines 860-890 blink the asterisk while waiting for the player to press a key.

Lines 900-950 are the procedure if the left arrow key is pressed. The asterisk moves one column to the left, or it stays at the left-most column. Lines 960-1010 move the asterisk one column to the right, or keep it at the right-most column. A "beep" is sounded whenever the asterisk is moved.

Lines 1020-1180 contain the procedure for the up arrow, or moving a card from the bottom of a column to an empty column. Lines 1040-1070 make sure there is an empty space in the top row. Line 1080 makes sure the card to be moved is not already in the top row. Lines 1090-1160 move the card to the top row, and Line 1170 calls the subroutine to erase the card from the bottom.

Lines 1190-1300 contain the procedure for discarding. Line 1210 makes sure the asterisk is not over an empty column. Lines 1220-1290 erase a card only after checking to make sure a card in another column has the same suit and is of higher value.

Lines 1310-1560 contain the procedure for dealing four more cards when the ENTER key is pressed. First, Line 1330 checks to see if more cards are available; otherwise the game ends. Lines 1340-1360 make sure there are not nine cards in a column (or the

(See Page 11)



# REGENA ON BASIC —

(Continued from Page 10)

game ends.

Lines 1370-1410 check to see if the four aces are at the top of the columns. If the four aces are in place, the game will end. If you prefer to let the game continue, you may delete Line 1410, which goes to the end.

Lines 1420-1490 deal the four cards in the appropriate positions at the bottom of each column. Line 1500 calculates how many cards are left in the deck, and Lines 1510-1550 print how many cards are left.

Lines 1570-1840 are the subroutine to choose a card randomly and then draw it. The subroutine from Line 1690 to 1840 is also used to draw a card when it is moved to the top of a column. Line 1580 is RANDOMIZE to make the game different each time.

Lines 1590-1620 choose the cards if they are the last four cards to be dealt. Rather than taking the time to find them with random selection, the last four are just selected from those left. Unfortunately, they will be in order numerically in the suits hearts, diamonds, spades and clubs. However, waiting for these cards to be selected randomly is usually noticeably slower. If you prefer the random selection, delete Lines 1590-1620.

Other cards are selected randomly in Line 1630. CC is a number from 1 to 52. Lines 1640-1650 make sure that card has not previously been chosen. When the card is selected, CARD(CC) is set equal to 1. If it has not been previously selected, CARD(CC)=0. Lines 1660-1680 determine the suit and number of the card. The first 13 numbers are hearts, then diamonds, then spades, then clubs. The cards are actually numbered 1 through 13 but will show 2 through 10, then J, Q, K, A. I did this so that

when the numbers are compared, the Ace will be the highest number.

Lines 1690-1840 draw the card using the position of the upper left corner with coordinates J,K. Lines 1710-1780 draw the white card. Line 1790 draws the symbol for the suit. Lines 1800-1830 draw the number red or black depending on the suit. The suit symbols are 118, 119, 120 and 121, where 118 and 119 are in the red character set and 120 and 121 are in the black set.

Lines 1850-2040 are the subroutine to erase a card. J is the row coordinate, and AA is the same column as the asterisk. Lines 1890-1990 remove the card and draw the card underneath if the card is not on the top row. If the card is on the top row, the card is erased with Lines 2000-2040. When a card is discarded, the row number is decreased in Line 1980 or 2030.

Lines 2050-2080 are the subroutine to print a message M\$ on the screen at row J and column K+1 without scrolling.

Lines 2090-2180 print the message when the game is over and whether you won or lost. Lines 2190-2240 present the option to play again and wait for you to press the Y key for Yes or N key for No. Lines 2250-2260 clear the screen and end the program.

Remember as you are typing this program in from the listing that the ! and numbers at the end of each line are not to be typed. These numbers indicate checksum numbers when you use Tom Freeman's Checksum program as an aid to typing in published programs (see note on Contents page of this issue).

If you prefer to save typing effort, you may have a copy of this program by sending \$4 to *REGENA*, 918 S. Cedar Knolls West, Cedar City, UT 84720. Be sure to specify that you need the TI version of Four-card and whether you want cassette or diskette.

## Fourcard Solitaire

```
100 REM FOURCARD !048
110 REM BY REGENA !071
120 DIM CARD(52),T(9,4,2),R(
4)!133
130 CALL CLEAR !209
140 PRINT TAB(5);"** FOURCAR
D **" !202
150 CALL CHAR(60,"080402FF02
0408")!148
160 PRINT : "FOUR CARDS ARE
DEALT. IF" !046
170 CALL CHAR(61,"102040FF40
201")!086
180 PRINT "ANY SUITS MATCH,
YOU MAY" !248
190 CALL CHAR(62,"0010101092
54381")!162
200 PRINT "DISCARD THE LOWES
T CARD BY" !107
210 CALL CHAR(64,"0010385492
10101")!164
220 PRINT "USING THE ARROW K
EYS TO MOVE" !039
230 CALL CHAR(136,"00183C7E7
```

```
E3C18")!247
240 PRINT "OVER THE RIGHT CO
LUMN, THEN" !194
250 CALL COLOR(9,16,1)!233
260 PRINT "PRESS THE > KEY."
!150
270 CALL COLOR(10,7,16)!024
280 PRINT : "TO DEAL 4 MORE C
ARDS, PRESS" !025
290 CALL COLOR(14,11,1)!017
300 PRINT "THE ";CHR$(136);"
ENTER KEY." !254
310 CALL COLOR(11,7,16)!025
320 PRINT : "PRESS @ TO MOVE
A BOTTOM" !141
330 CALL COLOR(12,2,16)!021
340 PRINT "CARD TO AN EMPTY
TOP SPOT." !095
350 CALL COLOR(13,2,16)!022
360 PRINT : "GET ALL FOUR ACE
S ON TOP!": : !178
370 FOR C=96 TO 134 !218
380 READ C$ !254
390 CALL CHAR(C,C$)!081
```

```
400 NEXT C !217
410 DATA 00030F1F3F3F7F7F,FF
FFFFFFFFFFFFFF,00C0F0F8FCFCF
EFE,FEFEFCFCF8F0C,7F7F3F3F1F
0F03,,0 !042
420 DATA 1824040408103C,3C04
0418040438,202424243E0404,3C
403804042438,1C20203C24241C,
3C04040808101 !005
430 DATA 18242418242418,1C24
241C040404,8C92929292928C,04
040404042418,38444444444C34,
24283028282424 !085
440 DATA 18242424243C2424,0,
22777F7F7F3E1C08,081C3E7F3E1
C08,081C3E3E7F7F3608,081C082
A7F2A0808 !084
450 DATA 1824040408103C,3C04
0418040438,202424243E0404,3C
403804042438,1C20203C24241C,
3C04040808101 !005
460 DATA 18242418242418,1C24
241C040404,8C92929292928C,04
```

(See Page 12)



## REGENA ON BASIC—

(Continued from Page 11)

```

040404042418,384444444444C34,
24283028282424 !085
470 DATA 18242424243C2424 !1
74
480 PRINT "PRESS ";CHR$(136
);"ENTER TO START.";!130
490 CALL KEY(0,KEY,S)!089
500 IF KEY<>13 THEN 490 !126
510 CALL CLEAR !209
520 PRINT "SHUFFLING DECK...
" !219
530 FLAG=0 !209
540 FOR C=1 TO 52 !105
550 CARD(C)=0 !129
560 NEXT C !217
570 FOR C=1 TO 4 !053
580 FOR D=1 TO 2 !052
590 T(1,C,D)=0 !095
600 NEXT D !218
610 NEXT C !217
620 CALL CLEAR !209
630 PRINT "<LEFT" !207
640 PRINT "=RIGHT" !036
650 PRINT ">DISCARD" !163
660 PRINT "@MOVE" !223
670 PRINT :CHR$(136);"DEAL"
!142
680 PRINT " `aab" !193
690 PRINT " a48a" !182
700 PRINT " LEFT" !179
710 PRINT " aaaa" !012
720 PRINT " aaaa" !012
730 PRINT " daac": : : : : :
!079
740 J=2 !003
750 K=12 !054
760 DECK=48 !011
770 FOR D=1 TO 4 !054
780 GOSUB 1580 !130
790 T(1,D,1)=SUIT !098
800 T(1,D,2)=N !108
810 R(D)=1 !187
820 K=K+5 !019
830 NEXT D !218
840 A=1 !249
850 AA=8+5*A !004
860 CALL KEY(0,KEY,S)!089
870 CALL HCHAR(1,AA,42)!079
880 CALL HCHAR(1,AA,32)!078
890 IF S<1 THEN 860 !104
900 IF KEY<>83 THEN 960 !093
910 REM MOVE LEFT !092
920 IF A=1 THEN 860 !085
930 CALL SOUND(100,1492,2)!1
85
940 A=A-1 !252
950 GOTO 850 !164
960 IF KEY<>68 THEN 1020 !15
6
970 REM MOVE RIGHT !175
980 IF A=4 THEN 860 !088
990 CALL SOUND(100,1492,2)!1
85
1000 A=A+1 !251
1010 GOTO 850 !164
1020 IF KEY<>69 THEN 1190 !0
72
1030 REM MOVE UP !214
1040 FOR B=1 TO 4 !052
1050 IF R(B)=0 THEN 1080 !24
1
1060 NEXT B !216
1070 GOTO 860 !174
1080 IF R(A)=1 THEN 860 !020
1090 J=2 !003
1100 K=7+5*B !205
1110 SUIT=T(R(A),A,1)!101
1120 N=T(R(A),A,2)!111
1130 R(B)=1 !185
1140 T(1,B,1)=SUIT !096
1150 T(1,B,2)=N !106
1160 GOSUB 1700 !250
1170 GOSUB 1870 !165
1180 GOTO 860 !174
1190 IF KEY<>88 THEN 1310 !1
94
1200 REM DISCARD !212
1210 IF R(A)=0 THEN 860 !019
1220 FOR B=1 TO 4 !052
1230 IF R(B)=0 THEN 1290 !19
6
1240 IF A=B THEN 1290 !077
1250 IF T(R(B),B,1)<>T(R(A),
A,1)THEN 1290 !081
1260 IF T(R(A),A,2)>T(R(B),B
,2)THEN 1290 !148
1270 GOSUB 1870 !165
1280 B=6 !255
1290 NEXT B !216
1300 GOTO 860 !174
1310 IF KEY<>13 THEN 860 !24
2
1320 REM DEAL !240
1330 IF DECK=0 THEN 2100 !00
7
1340 FOR B=1 TO 4 !052
1350 IF R(B)=9 THEN 2100 !25
0
1360 NEXT B !216
1370 FOR BB=1 TO 4 !118
1380 IF T(1,BB,2)<>13 THEN 1
420 !219
1390 NEXT BB !026
1400 FLAG=1 !210
1410 GOTO 2100 !139
1420 FOR B=1 TO 4 !052
1430 R(B)=R(B)+1 !123
1440 J=2*R(B)!199
1450 K=7+5*B !205
1460 GOSUB 1580 !130
1470 T(R(B),B,1)=SUIT !103
1480 T(R(B),B,2)=N !113
1490 NEXT B !216
1500 DECK=DECK-4 !171
1510 DS=" "&STR$(DECK)!037
1520 MS=SEG$(DS,LEN(D$)-1,2)
!163
1530 J=14 !055
1540 K=4 !006
1550 GOSUB 2050 !090
1560 GOTO 860 !174
1570 REM DEAL CARD !042
1580 RANDOMIZE !149
1590 IF DECK>4 THEN 1630 !05
3
1600 FOR CC=1 TO 52 !172
1610 IF CARD(CC)=0 THEN 1650
!057
1620 NEXT CC !028
1630 CC=INT(52*RND)+1 !006
1640 IF CARD(CC)<>0 THEN 163
0 !230
1650 CARD(CC)=1 !197
1660 SUIT=INT(((CC-1)/13)!224
1670 N=CC-13*SUIT !138
1680 SUIT=SUIT+1 !003
1690 REM DRAW CARD !066
1700 CALL SOUND(100,592,2)!1
36
1710 CALL VCHAR(J,K,96)!127
1720 CALL VCHAR(J+1,K,97,4)!
235
1730 CALL VCHAR(J+5,K,100)!0
97
1740 CALL VCHAR(J,K+1,97,6)!
237
1750 CALL VCHAR(J,K+2,97,6)!
238
1760 CALL VCHAR(J,K+3,98)!06
2
1770 CALL VCHAR(J+1,K+3,97,4
)!168
1780 CALL VCHAR(J+5,K+3,99)!
254
1790 CALL HCHAR(J+1,K+2,117+
SUIT)!025

```

(See Page 13)



## REGENA ON BASIC—

(Continued from Page 12)

```

1800 IF SUIT>2 THEN 1830 !04
2
1810 CALL HCHAR(J+1,K+1,103+N)!028
1820 GOTO 1840 !134
1830 CALL HCHAR(J+1,K+1,121+N)!028
1840 RETURN !136
1850 REM DISCARD !212
1860 REM ERASE CARD !132
1870 J=R(A)*2 !198
1880 CALL SOUND(100,440,2)!1
28
1890 IF R(A)=1 THEN 2000 !14
0
1900 CALL HCHAR(J,AA-1,97,4)!021
1910 CALL HCHAR(J+1,AA-1,97,4)!208
1920 CALL HCHAR(J+2,AA-1,97,4)!209
1930 CALL HCHAR(J+3,AA-1,100)!068
1940 CALL HCHAR(J+3,AA,97,2)!020
1950 CALL HCHAR(J+3,AA+2,99)!036
1960 CALL HCHAR(J+4,AA-1,32,4)!200
1970 CALL HCHAR(J+5,AA-1,32,4)!201
1980 R(A)=R(A)-1 !122
1990 RETURN !136
2000 FOR BB=AA-1 TO AA+2 !25
1
2010 CALL VCHAR(J,BB,32,6)!0
96
2020 NEXT BB !026
2030 R(A)=0 !183
2040 RETURN !136
2050 FOR BB=1 TO LEN(M$)!044
2060 CALL HCHAR(J,K+BB,ASC(
EG$(M$,BB,1)))!096
2070 NEXT BB !026
2080 RETURN !136
2090 REM GAME OVER !080
2100 M$="GAME OVER" !117
2110 J=19 !060
2120 K=2 !004
2130 GOSUB 2050 !090
2140 M$="YOU LOST" !093
2150 IF FLAG<>1 THEN 2170 !0
18
2160 M$="YOU WON!" !048
2170 J=21 !053
2180 GOSUB 2050 !090
2190 M$="PLAY AGAIN? (Y/N)"!067
2200 J=24 !056
2210 GOSUB 2050 !090
2220 CALL KEY(0,KEY,S)!089
2230 IF (KEY=89)+(KEY=121)TH
EN 510 !127
2240 IF (KEY<>78)*(KEY<>110)
THEN 2220 !180
2250 CALL CLEAR !209
2260 END !139

```

### EXTENDED BASIC

## Line number crunching

By JERRY L. STERN

©J.L. Stern

I don't like the RESequence command in TI Extended BASIC. Most of the language is great, certainly one of the most powerful versions of BASIC available today. But I learned BASIC on an antique mechanical teletype machine. The teletype was connected to a time-shared mainframe computer, and printed out everything on enormous rolls of coarse yellow paper with chunks of wooden knotholes still in it. There were no commands for any kind of fancy printout, just print a line, advance a line, print a line. The fancy print controls consisted of the backspace command. Period.

The language was crude, but it had a few (very few) redeeming features. The RESequence command could start in the middle of the program and leave the beginning alone. When I wanted to insert a new section of code in the middle of a program, I could respace the portion I needed without messing up the line numbers to the rest

of the program.

The Extended BASIC and console BASIC RESequence, or RES, command is not that flexible. The entire program is always renumbered. The same increment is always used for line spacing throughout the program. Any subprogram that was deliberately numbered with a nice high set of line numbers is always moved down to the low number regions, where it gets all mixed up with the main program.

There is only one advantage to using either high or low numbers for program lines in TI BASIC — it makes the program easier to read and debug. There is no speed advantage, and no memory is saved by low line numbers. Using smoothly spaced lines makes the program more readable, and using high numbers for subprograms helps keep the program ready for adding new features by merging in additional subprograms later on.

The TI RES command handles bad line numbers in a poor fashion. Just because we may have lapsed for a moment into being

human, and left out a line number that another line was supposed to branch to, is no reason to be told to "GOTO 32767." Is that a place? Do computers think we would suffer if we went there?

It is possible to write our own program to resequence programs in Extended BASIC. By saving a program in MERGE format, we can store the program in a format readable by another program. The format of the merge file is not obvious, but we will need to understand only a few small parts of the format for this application. First, line number storage at the beginnings of lines and in the middle of lines. Next, the storage of remarks lines, and finally, a little bit of background about the file end marks.

Extended BASIC program lines are stored in a shorthand form, with "tokens" representing each command name. There is a token number assigned to each Extended BASIC reserved word. Any program line is represented as a string of numbers.

(See Page 14)



## EXTENDED BASIC—

(Continued from Page 13)

```

100 PRINT
is: 0 100 156 0
110 RANDOMIZE
is 0 110 149 0
120 GOTO 400
is 0 120 134 201 1 144 0
400 STOP
is 1 144 152 0

```

Line numbers are two bytes long. To convert back to the original line number, the first byte is multiplied by 256, and added to the second byte. In the middle of a line, the two bytes are preceded by the token 201 as identification.

Admittedly, our RESequence II program, RESEQ2 for short, will run more slowly than does RES. So, we had better make it worthwhile to run it. We'll need a wish list.

**WANTED**

1. The ability to space different portions of the program with different increments.
2. The option of leaving the high end numbers, for DATA statements and subprograms, at their original locations.
3. A printout of line numbers before and after the resequence.
4. Better treatment for undefined line numbers than just "GOTO 32767."

RESEQ2 works by reading the original program, in MERGE format, twice. The first time through, RESEQ2 makes a list of all the line numbers in use, and displays the lowest and highest line numbers, and the starting line number of the first subprogram. Because Extended BASIC will not allow any main program lines after that first subprogram line, that is a natural dividing point for the program. I generally leave my subprogram with the high line numbers they were originally written with. That makes them easier to reuse in other projects.

After creating a line number conversion table, RESEQ2 reads the file again, and searches for all the line numbers. Each line number is converted to the newly assigned number, and the new set of lines is saved in a new merge file.

Let's start at the beginning. On line 120 space is saved for the line number table as the matrix, or two-dimensional array, A(1,300). A(0,X) will be the old numbers, and A(1,X) will be the new numbers. The choice of 300 lines is arbitrary. You may

use a larger number if you think your programs will get that long. There is memory to spare, even with just the 32K memory card.

The DEF statements on lines 130 and 140 convert crunch or merge format line numbers to and from our normal base ten notation. Including them here makes these formulas less difficult to include in the operations to follow. DEF LN(T\$) converts FROM crunch format, and DEF CR\$(S) converts TO crunch format.

---

**The code searches each line for other line numbers. A line number can be recognized within a line by searching for the ASCII character #201. The two bytes that follow that character are a line number in base 256.**

---

Next, the file names are determined. The defaults of DSK1.TEMP and DSK1.NEWTEMP may be changed if you like other names.

Lines 200-260 read the original, or source file, for the first time, and convert the first two bytes of each line into the line numbers for both the new and old halves of the conversion table. Each line is checked until the first subprogram is found. That line will have the token for SUB immediately after the line number. That is, the command SUB will be represented in the third byte of the line by the token number 161.

When reading a disk file, usually the end of file command (EOF) is used to check that the program is not allowed to read past the end of the file. However, the last line of a merge format program file is not a program line, but the file end signal of the number 255 listed twice. RESEQ2 checks for the end of the file by looking for that code instead of the standard end of file code. When that signal is found, the file is set back to its beginning.

**RESTORE #1**

This statement allows the program to read the program file a second time without the need to close and reopen the file.

Next, the program asks for instructions on how to renumber the program lines. If

no choice is given for a first line, 100 will be used as a default. An increment is requested next, and the line number to use that increment until. That limit does not need to be a real line number; it can be any number between the last line number to be changed and the first number to be either left alone, or changed with the next increment value.

As the program receives the new line numbering instructions, it updates the line number table. When it reaches the stop point requested, it asks again for a new increment. If ENTER is pressed by itself at this point, RESEQ2 will stop making changes and go on to the next step. If the user of the program doesn't plan carefully, and asks for a 50-line program to be renumbered with an increment of 1000, the line numbers will become larger than the maximum allowed value of 32767. If RESEQ2 discovers this has happened, it will stop at this point and reset the new line number table as being equal to the old, and then start the process of asking for renumbering instructions again. This time, try more reasonable numbers.

Line 430 allows the printout of the altered line number table. If no printer name is given, this section will be skipped, and the process of converting the program will begin.

For every line, RESEQ2 must perform several actions. Each line begins with an old line number. That number is converted to the new number assigned in the line number table. This is not done by searching for the old number, but instead is done by assigning the first new line number to the first new line, the second to the second, and so on.

Next, the code searches each line for other line numbers. A line number can be recognized within a line by searching for the ASCII character #201. The two bytes that follow that character are a line number in base 256. The earliest position any line number could take within the body of the line would be immediately after the first command, for example, GOTO 200. That places the #201 code in the fourth byte of the line, so RESEQ2 will begin its search in that spot.

For each line number found in the body  
(See Page 15)



## EXTENDED BASIC—

## (Continued from Page 15)

of a line, RESEQ2 searches the table of old line numbers for that number, and then replaces the number in the line with the two-byte code for the new line number. If there is no matching old number, there is a reference error in the program; an instruction has been written to send program control to a non-existent line. Rather than just replace the old line number with "32767," RESEQ2 will add a comment, or tail remark to the end of the line.

If an old line reads — 200 ON X GO SUB 300,350,400 — and there is no old line number 350, then the new line would read like this:

```
240 ON X GOSUB 310,32767,380 ! RE
REFERENCE 340 TO 350
```

That means that the old line number was

positioned in the program between the new lines 340 and 350. The old line 350 was probably a remark statement that was deleted during revision. There should never have been a branch to a comment statement in the first place, but the tail remark will still help repair the damage.

After making the swap of the new line number for the old, RESEQ2 goes back to three bytes past the position where it found the first old number, and searches again for the next old number. It will repeat this search, replace and search routine until the POS command reports that there are no more characters #201 in the line. Finally, the new line may be written to the new program file, including the new tail remark if it needed one, and the end of line signal,

an ASCII code zero.

When all the lines have been converted, RESEQ2 prints one additional line to the new file, the line 255, 255. Those two ASCII characters signal the end of the merge file to Extended BASIC.

After running the program, the new file will be in merge format. To convert it back to program format, type:

```
NEW
MERGE DSK1.NEWTEMP
SAVE DSK1.NEWNAME
```

Well, that fixes one of the few annoying parts of Extended BASIC. There are some other features of other BASICs that would be a help to us in our programming. I think I had better get to work on converting them, too.

## RESEQ2

```
100 ! RESEQ2 !085
110 ! JLS 7/89 V.2.0 !183
120 DIM A(1,300)!067
130 DEF LN(T$)=VAL(STR$(ASC(
T$)*256+ASC(SEG$(T$,2,1))))!
099
140 DEF CR$(S)=CHR$(INT(S/25
6))&CHR$(S-INT(S/256)*256)!
CONVERTS LINE NUMBER INTO CR
UNCH FORMAT !034
150 CALL BLUE !145
160 DISPLAY AT(1,1)ERASE AL
L:"RESEQ2" :: CALL CHAR(125,
"00FF"):: CALL HCHAR(2,13,12
5,6)!141
170 DISPLAY AT(3,5):"FANCY R
ESEQUENCING" !084
180 DISPLAY AT(5,1):"NAME OF
FILE TO EDIT?":"DSK1.TEMP"
:: ACCEPT AT(6,4)SIZE(-12)VA
LIDATE(UALPHA,DIGIT,"_@.") :S
$ !117
190 DISPLAY AT(7,1):"NAME OF
NEW FILE?":"DSK1.NEWTEMP" :
: ACCEPT AT(8,4)SIZE(-12)VAL
IDATE(UALPHA,DIGIT,"_@.") :D$
!084
200 OPEN #1:"DSK"&$$,INPUT ,
DISPLAY ,VARIABLE 163 !203
210 X=0 !015
220 LINPUT #1:P$ :: X=X+1 ::
A(1,X),A(0,X)=LN(P$)!072
230 IF A(0,X)>32768 THEN 270
!085
240 DISPLAY AT(10,1):"READIN
```

```
G LINE #:";A(0,X)!135
250 IF SP>0 THEN 260 ELSE IF
SEG$(P$,3,1)=CHR$(161)THEN
SP=A(0,X)!159
260 GOTO 220 !043
270 X=X-1 :: RESTORE #1 !055
280 DISPLAY AT(10,1):"FIRST
LINE # WAS: ";A(0,1)!229
290 DISPLAY AT(11,1):"FIRST
SUBPROGRAM: ";SP !193
300 DISPLAY AT(12,1):"LAST L
INE # WAS: ";A(0,X)!017
310 DISPLAY AT(16,1)BEEP:"CH
ANGE FIRST LINE # TO #?" ::
ACCEPT AT(17,6)VALIDATE(DIGI
T)SIZE(5):Y$ !193
320 IF Y$="" THEN A(1,1)=100
ELSE A(1,1)=VAL(Y$)!253
330 DISPLAY AT(16,1)BEEP:"US
E INCREMENT TO LINE #":"INC?
TO?":"ENTER" STOPS CH
ANGES HERE." !073
340 ACCEPT AT(17,6)VALIDATE(
DIGIT)SIZE(5):F$ !174
350 IF F$="" THEN IF L=0 THE
N DISPLAY AT(17,1):""::
GOTO 310 ELSE 410 ELSE F=VAL
(F$)!083
360 DISPLAY AT(18,1):"ENTER
' TAKES CHANGES TO END" !174
370 ACCEPT AT(17,15)VALIDATE
(DIGIT)SIZE(5):T$ :: IF T$=""
THEN T=32767 ELSE T=VAL(T$
)!218
380 IF L>0 THEN 400 !147
```

```
390 A(1,0)=A(1,1)-F :: L=1 !
245
400 IF A(0,L)<=T THEN A(1,L)
=A(1,L-1)+F :: L=L+1 :: GOTO
400 ELSE 330 !004
410 IF A(1,L-1)<=A(1,L)THEN
430 ELSE A(1,L)=A(1,L-1)+10
:: L=L+1 :: IF L=X+1 THEN 42
0 ELSE 410 !033
420 IF A(1,X)>32767 THEN 570
!130
430 DISPLAY AT(20,1):"PRINT
LINE NUMBER TABLE TO?":"NUL
L' TO NOT PRINT TABLE" :: AC
CEPT AT(22,1):DV$ :: IF DV$=
"" THEN 490 !092
440 IF L=X-1 THEN 430 !202
450 OPEN #6:DV$,OUTPUT !184
460 PRINT #6:S$,D$ !223
470 FOR Z=1 TO X :: PRINT #6
:A(0,Z);A(1,Z),: NEXT Z !18
4
480 CLOSE #6 !156
490 OPEN #5:"DSK"&D$,OUTPUT,
DISPLAY ,VARIABLE 163 !037
500 FOR L=1 TO X :: SE=4 ::
LINPUT #1:P$ :: P$=CR$(A(1,L
))&SEG$(P$,3,LEN(P$)-2)!129
510 T=POS(P$,CHR$(201),SE)::
IF T=0 THEN 550 ELSE TL=LN(
SEG$(P$,T+1,2)):: SE=T+3 !02
1
520 FOR LP=1 TO X :: IF A(0,
LP)=TL THEN TL=A(1,LP):: GOT
(See Page 16)
```



## TRIALS OF A c99 BEGINNER

# Polynomial curves

By CHARLES E. KIRKWOOD JR.

A program to evaluate a polynomial with integer coefficients was published in the March 1989 c99 article. This month will be an expansion of this program to calculate and plot as many as ten polynomials on the same graph.

Originally this program was written in FORTRAN and, as you know, the subscript values in FORTRAN start with 1 rather than 0. This program will ignore the zero subscripts completely and start with 1, which will make a slight modification to the March program.

Several new functions are written:

**graph(nc,np,dx,dy,x,y,c,p,pr)** where nc is the number of curves, np is the number of points, dx is the x increment or step, dy is the y increment or step, x is an array of the x values, y is a two-dimensional array of the y values for each curve, c is an array for the points on the graph for each curve, p and pr are used to designate whether the output is on the screen or printer. This function can print as many as 10 curves on the same graph. The function can be used with other programs to plot curves that are not polynomials.

**y=ipoly(m,a,x)** where m is the number of coefficients of the polynomial, a is an array of the coefficients, and x is the value of the independent variable. This function is a slight modification of the March function since the subscripts begin with 1 rather than 0.

**r=divrnd(a,b)** where a is the numerator and b is the denominator. This function is designed to round the integer division for plotting the curves. In this function, the result is rounded upward if the decimal fraction is more than one half and the result is positive and downward if the result is negative.

**b=iabs(a)** for the absolute value of a.

The program is more or less self-explanatory. Prompts are given for the input.

Generally not more than 4 or 5 curves can be seen well on the screen, but as many as 10 can be plotted on paper. If dy is input as 0, the graph function will calculate a dy value to make the graph fit on the screen or on a printer page. A total of 35 values of x

can be plotted on the screen and 74 on the printer. The user may wish to design his own characters for the points; the letters of alphabet are used with this program, A for the first curve, B for the second, etc. The plotted point will be \* when curves intersect.

Right now the output is formatted for 4 digits or a sign and 3 digits. This could be changed by the user.

```
/*polynomial evaluation with graph*/
#include DSK1.STDIO
extern atoi(),printf(),fprintf();
main()
{
    int aa[11],x[75],y[11][75],a[11][11],m[11];
    char c[11],s[10];
    int nc,n,mn,xo,xm,dx,dy,np,p;
    int i,j,k,pr,z;
    c[1]='A';
    c[2]='B';
    c[3]='C';
    c[4]='D';
    c[5]='E';
    c[6]='F';
    c[7]='G';
    c[8]='H';
    c[9]='I';
    c[10]='J';
    puts("Input 1 for screen output or\n");
    puts("      2 for printer output  ");
    p=atoi(gets(s));
    if(p==2)
        pr=fopen("PIO","w");
    puts("\nInput number of polynomials ");
    nc=atoi(gets(s));
    puts("\nInput degree and coefficients of polynomials\n");
    for(i=1;i<nc;++i)
    {
        printf("\nDegree of #&d ",i);
        n=atoi(gets(s));
        mn=n+1;
    }
}
```

(See Page 17)

## EXTENDED BASIC—

(Continued from Page 15)

```
0 540 !055
530 NEXT LP :: GOSUB 580 ::
TL=32767 !000
540 P$=SEG$(P$,1,T)&CR$(TL)&
SEG$(P$,T+3,LEN(P$)-T-2):: G
OTO 510 !094
550 DISPLAY AT(24,1):"WRITIN
G NEW LINE #: ";LN(P$):: PR
INT #5:P$ :: NEXT L !008
```

```
560 PRINT #5:CHR$(255)&CHR$(
255):: CLOSE #1 :: CLOSE #5
:: STOP !168
570 DISPLAY AT(1,1)ERASE ALL
:"BAD LINE #!" :: FOR J=1 TO
X :: A(1,J)=A(0,J):: NEXT J
:: GOTO 310 !135
580 FOR LP=1 TO X :: IF A(0,
LP)>TL THEN LP=X !167
590 NEXT LP !050
```

```
600 P$=SEG$(P$,1,LEN(P$)-1)&
CHR$(131)&" REFERENCE "&STR$(
(A(1,LP-1))&" TO "&STR$(A(1,
LP))&CHR$(0):: RETURN !127
29505 SUB BLUE !149
29510 ! SWITCHES DISPLAY TO
WHITE-ON BLUE; JLS 7/88 !230
29515 CALL SCREEN(5):: FOR L
=0 TO 14 :: CALL COLOR(L,16,
1):: NEXT L :: SUBEND !202
```



c99—

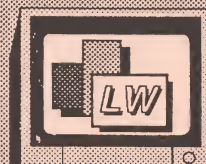
(Continued from Page 16)

```

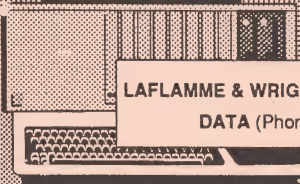
m[i]=mn;
for(j=1;j<=mn;++j)
{
    printf("\nCoefficient #d ",j);
    a[i][j]=atoi(gets(s));
}
putchar(10);
}
puts("Input initial value of x ");
xo=atoi(gets(s));
puts("Input last value of x ");
xm=atoi(gets(s));
puts("Input x increment ");
dx=atoi(gets(s));
puts("Input y increment ");
dy=atoi(gets(s));
k=1;
while(xo<=xm)
{
    for(i=1;i<=nc;++i)
    {
        mn=m[i];
        for(j=1;j<=mn;++j)
        aa[j]=a[i][j];
        y[i][k]=ipoly(mn,aa,xo);
    }
    x[k]=xo;
    xo=xo+dx;
    ++k;
}
np=k-1;
if(p==2)
{
    for(i=1;i<=np;++i)
    {
        fprintf(pr,"%4d ",x[i]);
        for(j=1;j<=nc;++j)
            fprintf(pr,"%4d ",y[j][i]);
        putc(10,pr);
    }
    putc(12,pr);
}
else
{
    putchar(12);
    for(i=1;i<=np;++i)
    {
        printf("%4d ",x[i]);
        for(j=1;j<=nc;++j)
            printf("%4d ",y[j][i]);
        putchar(10);
    }
}
puts("Press any character ");
z=getchar();

```

(See Page 18)



**LAFLAMME & WRIGLEY  
WHOLESALE**  
5480 Cambridge Road, Unit #16  
GLOUCESTER, ONTARIO  
K1J 5H6  
(613) 745-2225 FAX: 744-4784



**LAFLAMME & WRIGLEY**  
DATA (Phones):

Ottawa BBS (TEXLINK) (613) 738-0617  
DELPHI "JANELAFLAMME" (No space)  
CompuServe "76046,2006"

**Authorized Distributor for the following:**  
ASCARD Software  
GENIAL COMPUTERWARE  
MYARC, Inc.  
T and J Software

**Support your Canadian dealers:**

**CANARIA DATA INC.**  
264 Weber St. W.  
Kitchener, Ontario  
N2H 4A6  
(519) 578-3873

**DATA\*PORT**  
2846 Gottingen St.  
Halifax, N.S.  
B3K 3E1  
(902) 454-0232  
Data (TEXLINK) 455-2076

**COMPUTER DOWNLOAD  
UNLIMITED**  
8 Talon St.  
North Bay, Ontario  
P1A 1N5  
(705) 476-9391  
Data (TEXLINK) 476-3043  
CompuServe "73657,3617"  
DELPHI I.D. "CDU"

**DEALER ENQUIRIES WELCOME**

# HORIZON

## RAMDISK 3000

BARE BOARD \$40  
CONST. MANUAL + SOFTWARE

ZERO K KIT \$100      90 K KIT \$155

CHIP PRICES DOWN

512K KIT \$395

384K KIT \$320

1 MEG KIT \$695

ADD \$30 FOR BUILT & 90 DAY WARRENTY

## P-GRAM CARD

Complete and Kits ONLY

KIT \$150.    KIT+CLOCK \$170    Includes ALL parts

BUILT=\$180    BUILT+CLOCK=\$200    with 6Month warrenty

Includes User and Construction Guides Plus Software

ORDER FROM      BUD MILLS SERVICES

Visa, MC, AmEx add 10%

Call 1-800-456-8774

(DISK ONLY SOFTWARE)

166 DARTMOUTH DR.

TOLEDO OH 43614

419-385-5946

Ohio Residents add 6% sales tax  
Shipping and Handling included within U.S. and Canada  
Shipping Overseas ADD \$ 5 Surface or \$15 AirMail  
INFO? BBS 419/385/7484 300/7/E or 1290/8/N



c99—

(Continued from Page 17)

```

}
putchar(12);
graph(nc,np,dx,dy,x,y,c;p,pr);
if(p==2)
fclose(pr);
}

```

```

ipoly(m,a,x)
int m,x;
int a[];
{
    int i,y;
    y=a[1];
    for(i=2;i<=m;++i)
        y=y*x+a[i];
    return(y);
}

```

```

graph(n,m,dx,dy,x,yy,s,p,pr)
int m,n,dx,dy,pr,p;
int x[],yy[][75];
char s[];
{
    char pl[75];
    int y[11][75];
    int nn,nt,i,j,ymin,ymax;
    int line,iu,iv,val,iy,e;
    nn=0;
    nt=0;
    for(i=1;i<11;++i)
    {
        for(j=1;j<74;++j)
            y[i][j]=30000;
    }
    if(x[1]<=0)
    {
        nn=divrnd(x[1],dx);
        nt=1;
        nn=iabs(nn)+1;
    }
    ymax=yy[1][1];
    ymin=ymax;
    for(i=1;i<=n;++i)
    {
        for(j=1;j<=m;++j)
        {
            if(yy[i][j]<ymin)
                ymin=yy[i][j];
            else if(yy[i][j]>ymax)
                ymax=yy[i][j];
        }
    }
}

```

```

}
if(dy==0)
{
    if(p==2)
        dy=(ymax-ymin)/60+1;
    else
        dy=(ymax-ymin)/21+1;
}
iu=divrnd(ymin,dy)-2;
for(i=1;i<=n;++i)
{
    for(j=1;j<=m;++j)
        y[i][j]=divrnd(yy[i][j],dy);
}
iv=divrnd(ymax,dy)+1;
while(iv!=iu)
{
    val=iv*dy;
    for(i=1;i<74;++i)
        pl[i]=' ';
    if(nt==1)
        pl[nn]='|';
    if(iv==0)
    {
        for(i=1;i<=m;++i)
            pl[i]='-';
        if(nn>0)
        {
            i=nn;
            while(i<=m)
            {
                pl[i]='+';
                i=i+10;
            }
        }
        i=1;
        while(i<=nn)
        {
            j=nn+1-i;
            pl[j]='+';
            i=i+10;
        }
    }
    for(i=1;i<=n;++i)
    {
        for(j=1;j<=m;++j)
        {
            iy=y[i][j];
            if(iv==iy)
            {
                if((pl[j]>='A') & (pl[j]<='J'))

```

```

                pl[j]='*';
            else
                pl[j]=s[i];
        }
    }
    iv=iv-1;
    if(p==2)
        fprintf(pr,"\n%4d ",val);
    else
        printf("\n%4d ",val);
    for(i=1;i<=m;++i)
    {
        if(p==2)
            putc(pl[i],pr);
        else
            putchar(pl[i]);
    }
}
dy=0;
return;
}

divrnd(a,b)
int a,b;
{
    int c,d,e;
    c=a/b;
    d=a%b;
    e=b/2;
    d=iabs(d);
    e=iabs(e);
    if(d>e)
    {
        if(c<0)
            c=c-1;
        else
            c=c+1;
    }
    return(c);
}

iabs(n)
int n;
{
    int m;
    if(n<0)
        m=-n;
    else
        m=n;
    return(m);
}

```

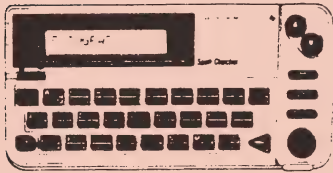


**TEX<sub>+</sub>COMP™**

Now get more out of your TI Computer —

**SPELL•CHECKER FROM TI**

NOW HAVE INSTANT ACCESS TO OVER 93,000 WORDS..AT RAM DISK SPEED!!

**SPELL-CHECKER****Unique Slide Case:**

- Handy slide case protects the Spell-Checker and stores in back when not in use.



TEXAS INSTRUMENTS HAS JUST INTRODUCED THE 2nd GENERATION SPELLING CHECKER. THIS IS THE ULTIMATE ACCESSORY TO PLACE ALONG SIDE OF YOUR 99/4A TO PROVIDE INSTANT SPELLING VERIFICATION AND FREE UP YOUR COMPUTER'S MEMORY. THIS COMPACT STAND ALONE UNIT CONTAINS OVER 93,000 WORDS AND THE UNIQUE LINQUISTLY BASED INTERNAL SOFTWARE LETS YOU FIND THE CORRECT SPELLING JUST BY ENTERING WORDS THE WAY THEY SOUND TO YOU. THERE IS EVEN AN ALL NEW ENDINGS KEY THAT DISPLAYS A WORD WITH ITS COMMON ENDINGS. IT IS A PERFECT MATCH FOR THE TI-99/4A AND HAS ITS OWN COMPUTER STYLE KEYBOARD AND A BIG 15 CHARACTER DOT-MATRIX DISPLAY. ORDER NOW WHILE SUPPLIES ARE IN STOCK AS THIS IS GOING TO BE A FANTASTIC SELLER.

**ONLY \$69.95 +s&h**  
(895.00retail)

FREE BONUS: WITH EACH TI SPELL\*CHECKER YOU RECEIVE A FREE VERSION OF "99WRITER 2", (TI WRITER ON A DISK) COMPLETE WITH A 58 PAGE EASY TO FOLLOW MANUAL.

**ANNOUNCING****\$9.95 +S&H****THE POWER OF THE NAVARONE DATABASE**FREE WITH DATABASE  
SEE OFFER BELOW!!!**MANAGEMENT SYSTEM****AN ALL NEW TUTORIAL BY BILL GASKILL**

ONE OF THE ALL TIME BEST SELLING DATA BASE PROGRAMS FOR THE TI-99/4A IS THE DATA BASE MANAGER BY NAVARONE. BILL GASKILL, THE UNDISPUTED EXPERT ON 99/4A DATA BASES AND REVIEWER FOR MICROPENDIUM, AGREES WITH US. IN BILL'S OPINION, THE NAVARONE DATA BASE MANAGER PRODUCES THE BEST AND MOST USEABLE REPORTS OF ANY OF THE AVAILABLE PROGRAMS. BECAUSE THERE WERE SO MANY OF THESE POWERFUL PROGRAMS SOLD WHICH ADMITTEDLY LACKED IN DOCUMENTATION, BILL HAS WRITTEN AN ALL NEW AND EASY TO FOLLOW TUTORIAL ON USING THIS POWERFUL DATABASE AND HAS ALSO INCLUDED A DISK OF UTILITIES WITH THIS PACKAGE. IT WAS DEVELOPED EXCLUSIVELY FOR TEX-COMP AND IS OFFERED FOR THE LOW LOW PRICE OF \$9.95.

S-P-E-C-I-A-L...IF YOU DO NOT ALREADY HAVE THIS POWERFUL DATABASE PROGRAM THAT COMES IN A MODULE AND DISK PACKAGE, YOU CAN ORDER IT NOW AT THE REGULAR PRICE OF \$39.95 AND RECEIVE THE TUTORIAL AND UTILITY DISK FREE. THIS IS THE ONE 99/4A DATA BASE PROGRAM THAT IS TRIED AND TESTED AND RATED THE BEST. YOU WON'T HAVE TO WORRY ABOUT BEING HIT UP TO BUY A NEW VERSION EVERY COUPLE OF MONTHS OR HAVE TO WATCH THE BOARDS AND MAGAZINES TO LEARN ABOUT BUGS.

SEND ORDER AND MAKE CHECKS PAYABLE TO:

THE POWER OF THE NAVARONE DATABASE TUTORIAL  
BY BILL GASKILL WITH UTILITY DISK, ONLY \$9.95+s&h  
THE NAVARONE DATA BASE MANAGER PROGRAM COMPLETE  
WITH "THE POWER" TUTORIAL AND DISK, ONLY \$39.95+s&h

**TEX<sub>+</sub>COMP™**

P.O. BOX 33084 — GRANADA HILLS, CA 91344  
Visa and MasterCard Holders Order Direct  
(818) 366-6631

## THE MAKING OF A PORTABLE TI

# Making room for the RAMdis! means condensing 32K memory circuitry

By JAN JANOWSKI

This is the second in a three-part series about building a TI console that includes a memory expansion, RAMdisk and printer port.—Ed

It was quickly beginning to dawn on me that the size of this project was larger than that of my first portable. I needed the inclusion of a 32K memory expansion on this card, and it had to take up as little space as possible. The 32K memory had to be built and tested *before* I could build the RAMdisk, but the RAMdisk had to be laid out around the 32K memory mod!

I solved this classic problem, of “which came first, the chicken or the egg,” by making a photostat of the expansion board and making paper cutout models of the integrated circuits. I then placed them on the copy page and moved them around until the layout design looked about right. But even then I still had a problem in that the memory expansion was taking up too much space.

### CONDENSING THE CIRCUITRY

I gave up trying to create a layout design for both and started using a “proto-board,” and I worked on the 32K memory mod exclusively, focusing my efforts on getting the size of the circuitry as small as possible. I wonder how many of you are aware of or have bought the TI hardware modification manual that the Chicago Users Group is selling (the cost of the manual, with postage and handling, is \$10.)? Let me tell you, if you are into hardware mods, it is worth its weight in gold. It includes a schematic and board layout for a 32K memory upgrade, using just one chip, and I used that design as a basis from which to start.

This 32K memory expansion module can be built using only one chip, one transistor, eight diodes, and four resistors, and the size ends up being 2.75 inches by 1.75 inches. I later ended up eliminating the transistor and one resistor; the size of the board space that I am now using is 1.5 inches by .75 inches (only 25 percent as much space). Compare this 1.24 square inches to a 32K card for an expansion box.

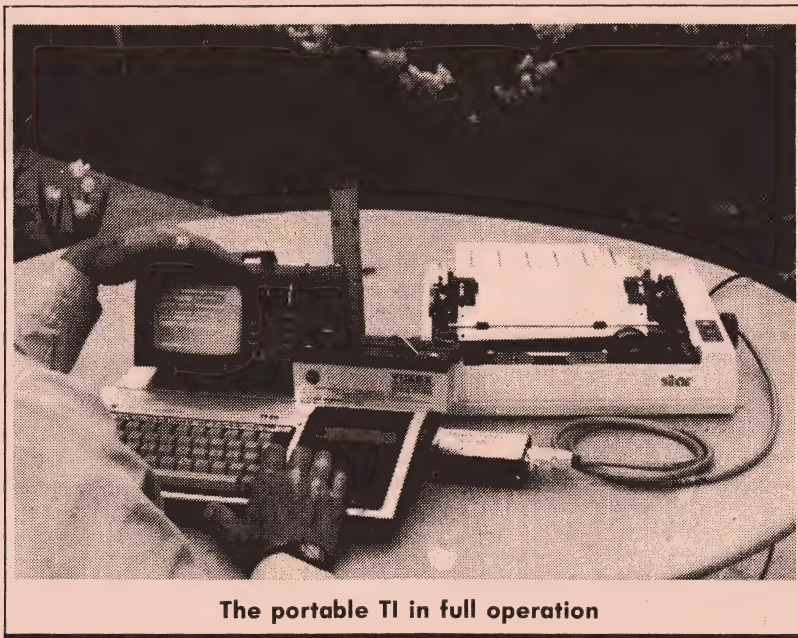
Parts were eliminated by picking up one

scheme, I would go crazy trying to find a broken wire once things were completed. Can you imagine hundreds of wires all of the same color tightly wired on a board, and one end of one wire comes off?

Therefore, I decided on a color code to at least reduce my level of confusion a wee bit. For ground, I used black wire. For +5v, I used red wire. For the data bus wiring, I used blue wire. For the address bus, I used yellow wire. And for wiring not of

the above types, I used white wire. This one bit of forethought saved me untold hours of frustration. (See parts layout and board size drawing.)

As I started transcribing wires from schematic to expansion board, I uncovered one signal that occurs in the expansion box that does not occur inside the console. You will not find the equivalent of pin 11, of the PEB board, “Not RDBEN,” in the console, because this signal is unique to the PEB. What this signal does is as follows:



The portable TI in full operation

more signal from the computer board, (“Not DBIN” from U508 pin 9), rather than using “DBIN” from the GROM socket. By doing this, I eliminated the need for the transistor and pullup resistor. Also, by moving the diodes around carefully, I was able to install all the circuitry *underneath* the IC socket.

Using this reduced sizing for the 32K memory upgrade, it was possible to layout the RAMdisk, and with the RAMdisk and 32K laid out, there was still 26 square inches of board space available.

### WIRING THE BOARD

I next started with the wiring on the expansion board. I had earlier decided that if I didn't develop some type of wiring

Let's say that a RAMdisk inside the expansion box wants to send some data to the computer. The RAMdisk puts a “low” on pin 11, which disables any other card in the PEB from outputting data, and simultaneously enables the output data tranceiver on its own board. Here is what I mean by “enabling the data tranceiver.” The data bus, unlike the address bus, sends data in both directions, to and from the computer. Tranceivers both send and receive, but these functions cannot be done *simultaneously*. Picture a traffic cop keeping the two-way traffic from colliding on a one lane street — this is exactly what happens. “DBIN” enables the input side (data.

(See Page 21)



## PORTABLE TI—

(Continued from Page 20)

from computer), while the logic that creates "Not RDBEN" enables the output side (data to computer).

My problem was that "Not RDBEN" does not exist in the console, and though the RAMdisk might work inside the console, would it work in conjunction with the PEB?

Fortunately, it turns out that it does, and the "Not RDBEN" signal can be disregarded in the console, for this project, at least.

Remember pin 11? Let's follow it to the console. Pin 11, "Not RDBEN," from any PEB card, goes to the PEB expansion card (the interface card, which usually sits in slot one of a PEB) where it is buffered, renamed "Not RDBENA.A" (which does the exact same thing it did before) and is passed directly to the black cable and to the plug at the right side of the TI console. Inside this black connector, there are more electronics, and this signal "Not RDBENA.A" becomes the enable for the data bus transceiver in the large black plug in the side of the TI console. Then, and only then, will data get inside the console from the PEB.

You can imagine my concern that the two separate data bus enables would cause data collisions, but, thank goodness, they haven't.

So, I continued on, and on with the wiring — I stopped only after the ground bus wiring was installed. Then I put it all together to verify it wouldn't crash the computer. I then took it apart, added the +5v wiring, reassembled it, and tested it again.

I took it apart again and added the 32K memory expansion, put it back together, and tested it again. This went on, and on. I finally got to the point where the 32K memory was functional. (I tested its functionality with the TI Diagnostics program and a Mini-Memory Cartridge.) Once I got that far, I was able to use this 32K memory to run other tests.

One thing led to another. Now I was finally beginning to see some results from my work. You can see the placement of the parts on the expansion board and the cutouts and notches needed to have the ex-

(See Page 26)

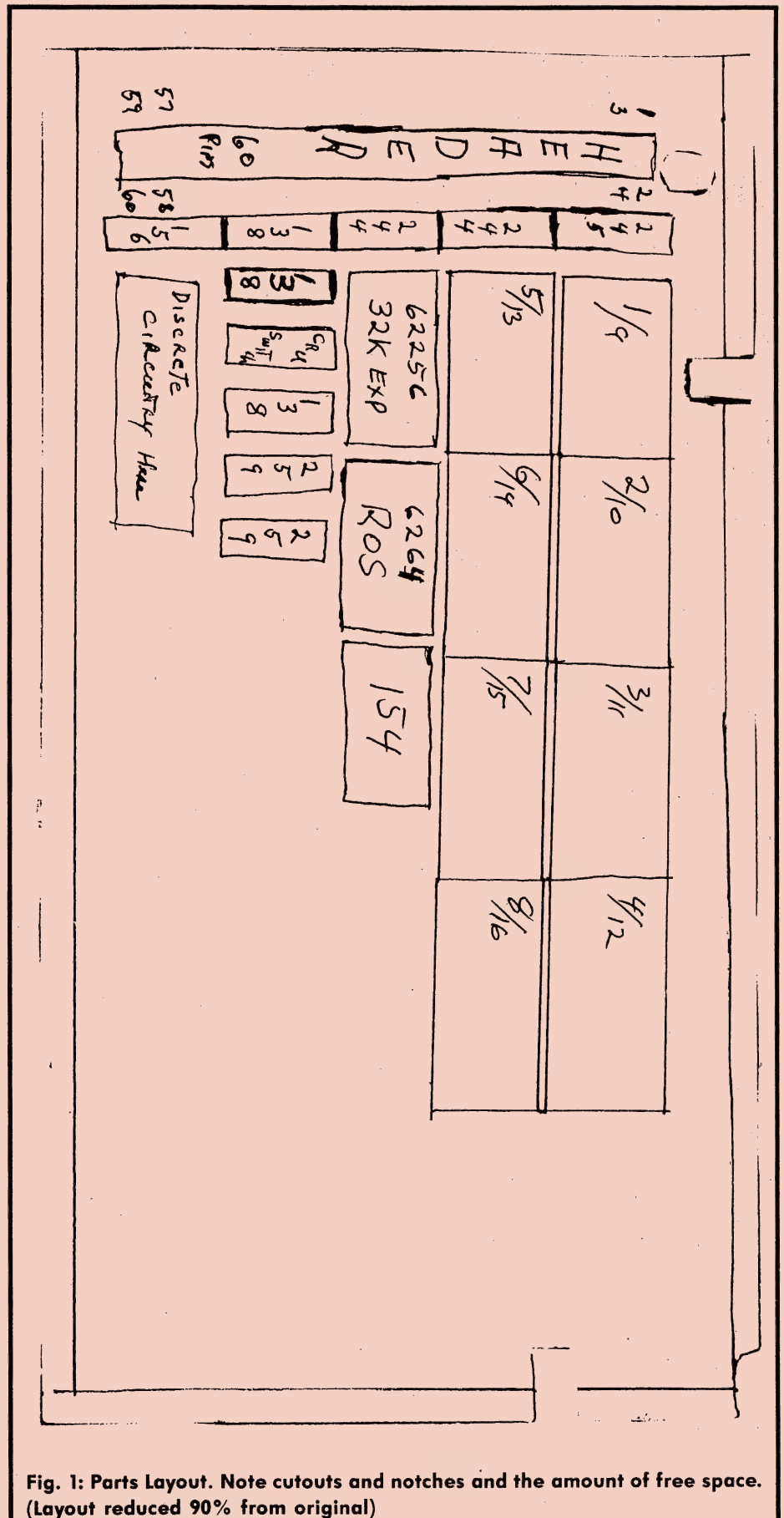


Fig. 1: Parts Layout. Note cutouts and notches and the amount of free space. (Layout reduced 90% from original)

# TEX+COMP Celebrating Our Tenth Year FREWARE

THE TOP IN QUALITY,  
SELECTION AND VALUE

•• Public Domain and Shareware for the  
Texas Instruments TI-99/4A Computer.



## NEW FOR 89' INCREDIBLE SOFTWARE

GAMES • BUSINESS • GRAPHICS • WORD PROCESSING • UTILITIES • DATABASE • MUSIC • COMMUNICATIONS • HOME

The TEX-COMP Freeware program is a disk distribution service which is operated to support the TI-99/4A user and programmer and to keep the TI-99/4A the best value in the computer world. The nominal charge (\$4.95) that is charged for each title is for distribution services only and includes the cost of duplication, premium grade disks, labels, advertising and packaging including plastic disk cases that we include at no extra cost with orders of four or more disks. When a program requires more than one disk side, we supply a floppy or even a second disk at no extra cost. The programs we distribute come from all over the world and are either public domain or the author has expressly agreed to freeware distribution or has placed the program into freeware distribution by providing it to a commercial bulletin board service.

### #1. THE SINGING TI-99/4A SPEECH & MUSIC DISK

This is the disk everyone is talking about. The computer voice actually sings to animated graphics. Includes routines by master programmer Ken Gilliland. Bert & Earnie, Maltilda & much much more. 2 disk sides, speech & 32 K req. Exbasic autoloader.

### #2. WHEEL OF FORTUNE, BLACKJACK & JOKER POKER

Three fantastic freeware programs on one disk. Professional quality and the best "wheel" game around at any price. Vanna would love it!

### #3. DUMPIT

This disk helps you transfer many TI modules to disk. Recommended for users with some programming ability. Ed/Assembler and "widget" recommended.

### #4. PRINTART

Two disk sides filled with files that print out great quality pictures on most printers. Many famous TV and comic characters on this disk. "Beam me up Scotty."

### #5 ORIGINAL TI SALES DEMO DISK WITH TI-TREK GAME

This disk is packed full of assorted files of all types. Graphics, speech etc. Contains complete TI-TREK game for Speech Editor or TE-II module.

### #5A. TI MUSIC/GRAPHICS

A great collection of music and matching graphics. Great examples of music & sprite programming.

### #6. EXBASIC MUSIC

A two disk side collection of music & graphics that we consider some of the best.

### #7. SPACE SHUTTLE MUSIC/GRAPHICS

One of the real outstanding examples of programming. This disk has it all. Great graphics, music, and continuity. A real salute to the space program. It is almost like watching a movie!

### #8. LOTTO PICKER

This program randomly generates numbers for use in the various state lotto games and even runs a simulated lotto game. Easy to modify for pick 6 etc. games. A great learning and fun disk.

### #9. MONA LISA PRINT OUT

This disk prints out a near photo quality picture of that lady with the classic smile. We understand it was made by digitizing the original with a super powerful computer and converting the output to run on the TI-99/4A. Impresses everyone who sees it! Requires Epson printer compatibility.

### #10. GOTHIC PRINT

This disk lets you type out a phrase on the screen and then print it out in gothic (Old English) style. Looks like hand-lettered calligraphy. Use for invitations, announcements and business cards.

### #11. ANIMATED CHRISTMAS CARD "WOODSTOCK"

This disk was actually originally sent to TEX-COMP as a greeting from master programmer Ray Kazmer. It was just too good not to share! One of the best examples of computer animation and graphics you will see on any computer!

### #12. TI-99 OLOPY

This great piece of programming actually simulates and plays the famous board game. For legal reasons we cannot name the game but "do not pass Go! but go directly to Jail!"

### #13. STRIP POKER (PG RATED)

Play Poker against your TI-99/4A. When you win a hand she loses--a piece of her clothes that is. Don't worry about being a lousy poker player. Another file is included where you don't even have to know an ace from a king.

### #14. FIGURE STUDY (PG RATED)

A collection of Playboy type centerfolds that can be printed out at your command. Use with any printer.

### #15. STAR/EPSON PRINTER DEMO

This 2 sided disk contains a large collection of demo programs to put your Star/Epson compatible printer through its paces. Learn what control codes can do! Lots of text and graphics examples. Second side has a great tutorial on printer graphics with examples!

### #16. SIDEWAYS PRINTOUT

This program allows you to print out the material from your printer sideways. Great for spreadsheets, banners and large graphics. Second side contains some new enhancements for Multiplan not available on the TI upgrade.

### #17. TI FORTH DEMO

This demo disk was released by TI to show the power of Forth. Fantastic music and graphics. Ed/Assem and 32K required!

### #18. TI DIAGNOSTIC

This program loads into the Mini-Memory module and checks out your entire system. Much better than disk based diagnostics that cannot be used if a problem in the disk system is at fault. Complete documentation on second side.

### #19. TI WRITER/MULTIPLAN UPGRADE

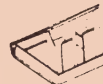
This disk released by TI adds real lower case to your TI Writer, speed to Multiplan and other enhancements. Easy to use.. just substitute new files for old! Instructions included.

### #20. ACCOUNTS RECEIVABLE

This self contained prize winning program loads and runs in Exbasic and has all the features found in a professional accounting system. Complete with documentation and a second disk side with report generating programs.

### #21. DATA BASE DEMO DISK

A professional data base program that was originally written to store various magazine articles from computer magazines and then find them by name, subject, key word, or publication. Fast, easy to use and easy to adapt for other applications. Come complete with sample data to make learning data base processing easy. Completely menu driven and unprotected.



BONUS

FREE DELUXE DISK STORAGE  
CASE WITH EACH ORDER OF  
FOUR OR MORE DISKS!!!



Send order and make checks payable to

**TEX+COMP**

P.O. BOX 33084 — GRANADA HILLS, CA 91344

TERMS: All prices F.O.B. Los Angeles. For fastest service use cashiers check or money order. Add 3% shipping and handling (\$3.00 Minimum). East of Mexico add 4% to price. Add 3% for credit card orders. Prices and availability subject to change without notice. We reserve the right to limit quantities.



TEXAS INSTRUMENTS



24 Hour Order Line

**(818) 366-6631**

NOTE: Payment in full must accompany all orders. Credit card. Company check > Money order for immediate shipment. Personal Checks require up to 4 weeks to clear. California orders add 6% sales tax.



# TEX+COMP Celebrating Our Tenth Year FREWARE™

•• Public Domain and Shareware for the  
Texas Instruments TI-99/4A Computer.



ONLY **\$4.95** Per Disk

Public Domain and Shareware  
Programs to Meet Your Every  
Computing Need.



**BONUS**

FREE DELUXE DISK STORAGE  
CASE WITH EACH ORDER OF  
FOUR OR MORE DISKS!!!

## #22. ASTROLOGY

This one is as good as anything you will see in an arcade. Great color graphics and displays of the Zodiac. Enter your birthdate and learn about your sign, your lucky days and famous events in history on your birthday. Even prints out a report. Can be used as a great moneymaker at a charity event. Help guide your spouse's career.

## #23. WILL WRITER

Enter your answers to a group of computer asked questions and this program then writes you a last will and testament. Now you can leave your TI-99/4A to your favorite nephew. Works with any printer. Appears legal in all states but better check that out!

## #24. ENGINEERING CALCULATIONS

A two sided computer handbook of dozens of the most often used engineering and technical formulas. A real time saver. Does conversions, calculations and even designs electrical circuits. A must for anyone whose profession or hobby involves scientific calculations. Even has medical and communications applications.

## #25. MEDICAL ALERT

This disk contains many menu accessible files covering most everyday medical emergencies. A good "what to do until the doctor or paramedic comes" guide. Well written and organized. Could very easily save a life!

## #26. R RATED GAME

It was bound to happen. A talented (but demented) programmer in Germany wrote an Invaders type game but with most unusual guns and targets. Definitely not what you would find at your neighborhood arcade. Not only a great party game but some great programming. You must be over 13 to order this one!!

## #27. KIDS LEARNING

An educator in Georgia put this two sided disk collection of educational programs together. Contains great material. Math, geography, reading improvement, and even IQ testing. All high quality programs for kids of all ages.

## #28. LOADERS AND CATALOGERS

We put together a collection of the best programs that catalog and load a group of programs on a disk. Just try them, pick the one you like and transfer it to another disk with the file name LOAD and you are in business.

## #29. LABEL MAKER I

Two great programs for making custom labels for disks, addresses, video tapes or any other application. Even contains a graphic display of the TI-99/4A console. Now you can create custom labels of any number by just typing in the lines as you want them. Uses standard tractor labels.

## #30. HOUSEHOLD BUDGET PRINTOUT

With this disk you print out the data you have stored with the TI HBM Module. HBM is a great module that can be used for many home and small business applications but TI forgot to include a printout function. This program comes with full instructions and we are sure that your HBM Module will now start being used. Fantastic programming job.

## #31. MORSE CODE TRAINER DISK

This disk has everything you need to learn and practice Morse Code for the various FCC license exams. It also is great for scout groups and school "ham" clubs for group training and merit badge qualification. Professional quality.

## #32. EXBASIC XMAS MUSIC

Two disk sides full of high quality xmas music that can be played throughout the holiday season and then used as a learning tool since it contains wonderful arrangements and graphics. Autoloading and menu driven.

## #33. CHECKERS & BACKGAMMON

A collection of great checkers and backgammon games for the TI-99/4A. These are professional in quality and will keep you busy for hours.

## #34. SOLITAIRE & SCRABBLE

Another collection of classic games for the TI-99/4A. Exbasic & 32K req.

## #35. PROGRAMMING AIDS & UTILITIES I

A collection of some unusual programs of interest to programmers. One program shows a group of opening title displays, another is a cross reference program as good as any of the commercial ones, plus a great disk management utility.

## #36. STRICTLY BUSINESS

A collection of various programs for evaluating loans, calculating interest, and other financial items such as return on investment and security performance. Two disk sides filled with financial and business related programs.

## #37. LAPD COOKBOOK

This unofficial police cookbook was put together by one of our boys in blue who is also a gourmet chef. (Yes, it contains jailhouse chili) Over 50 great recipes from soup to nuts on two disk sides and each separate side can be called up on screen or printer in exbasic from a menu. As good as any of the new PC computer cookbooks we have seen.

## #38. GREAT 99/4A GAMES VOL. I

A collection of professional games in assembly and exbasic that all load from a menu in exbasic. Includes a great ski game where you dodge the trees in a fast downhill run. We have included only the best.

## #39. GREAT 99/4A GAMES VOL. II

Still more of the great ones from all over the world. The quality, graphics and speed of many of these games will make you wonder why they were never released commercially.

## #40. ARTIFICIAL INTELLIGENCE

This disk contains the famous computer program "Eliza" where you type in a question or a problem you are having and "Eliza" helps you find the solution. Also contains one of the better bio-rhythm programs so you can analyze all your emotional problems at one sitting.

## #41. VIDEO GRAPHS MODULE BACKUP DISK

This disk is a backup of the discontinued Video Graphs Module from TI. For legal reasons, it can only be purchased for backup use by owners of the original module. Do not order UNLESS you have the original module and intend to use this disk only for backup purposes. Exbasic autoloading.

## #42. FUNNELWEB FARM UTILITY

You heard about this one, now direct from Australia is the latest version of this fantastic utility that puts everything at your command. From one program you can access word processing, editor assembler, telecommunications and just about everything else. A freeware program complete with documentation on a second disk side.

## #43. BEST OF BRITAIN, VOL I

Now for the first time, a collection of the best 99/4A games Britain has to offer including the famous "Billy Ball" series of arcade games. Great graphics, action and excitement.

## #44. LABEL MAKER I GRAPHICS

A disk filled with graphics for the Label Maker I disk (#29). Dozens of great graphics for custom labels!

## #45. BEST OF BRITAIN, VOL II

This disk contains an outstanding 3-D graphics adventure game for the TI-99/4A. Carfax Abbey lets you actually move through a four story mansion complete with bats and vampires. You actually are placed in each room and go up and down stairs and through secret panels. Legend of Zelda...look out!

## #46. SUPER TRIVIA 99

A great trivia game for 1 to 4 players with great questions and capability to add your own and print out the files. This one is a real challenge.

## #47. INFOCOM RAPID LOADER

If you have Infocom games this is for you. Loads all TI Infocom games in only 28 seconds and permits new screen colors and improved text display. Comes with all documentation on disk.

Send order and make checks payable to:

**TEX+COMP**  
P.O. BOX 33084 — GRANADA HILLS, CA 91344

TERMS: Payment in Advance. All orders subject to change without notice. All orders are shipped by air. Delivery times are approximate. Delivery times are approximate. Delivery times are approximate.



TEXAS INSTRUMENTS



24 Hour Order Line

**(818) 366-6631**

NOTE: Payment by check or money order must be accompanied by a return address. All orders are shipped by air. Delivery times are approximate. Delivery times are approximate. Delivery times are approximate.

# TEX+COMP Celebrating Our Tenth Year FREWARE™

•• Public Domain and Shareware for the  
Texas Instruments TI-99/4A Computer.

Public Domain and Shareware  
Programs to Meet Your Every  
Computing Need.

ONLY **\$4.95** Per  
Disk



**BONUS**

FREE DELUXE DISK STORAGE  
CASE WITH EACH ORDER OF  
FOUR OR MORE DISKS!!!

**#48. GHOSTMAN (from England)**  
This Pacman-Munchman type game starts at a slow pace and slowly speeds up to a break-neck pace. A totally new experience.

**#49. DEMON DESTROYER (from France)**  
This great assembly game starts where invaders leaves off. Add features like descending aliens and closing walls. Hours of great arcade action.

**#50. OH MUMMY (from Germany)**  
Move through the chambers of a Pyramid in search of hidden treasure. Fantastic graphics and great entertainment.

**#51. BERLIN WALL (from Canada)**  
This game requires a mine field to be crossed before escaping from E. Berlin. Good graphics and a real challenge.

**#52. ANIMATION 99 (from Germany)**  
THIS IS THE ONE!!! A demo disk filled with computer animation routines like you have never seen before on any computer. See famous cartoon figures move with more realism than on Sat. morning TV. This disk received a standing ovation when previewed at a local users group. We have even included instructions how to do it yourself on the second disk side. This one is a show stopper!!!

**#53. HACKER/CRACKER**  
A collection of disk copying programs that copy TI disks by tracks. If one of these can't copy a protected disk nothing will. We included a collection of the very best ones including both TI and CorComp compatible. These programs require 2 disk drives and 32K of memory.

**#54. ASTRONOMY**  
This program from Australia plots the heavens and teaches you about the solar system. A great learning and reference tool. Exbasic and 32K required. Don't confuse this one with our Astrology demo. They are not the same...ask Nancy!

**#55. SCREEN DUMP**  
This program allows you to dump disk and even module programs to a Star Epson compatible printer. Comes with easy to follow plans to build a load interrupt switch which is needed to dump module programs. This dump program by Danny Michael is considered the best of the bunch! Complete with documentation.

**#56. SPREAD SHEET**  
OK, it's not Multiplan but it works great and handles many spread sheet applications. A great way to learn to use spread sheet software. Comes with full instructions and documentation.

**#57. TELCO**  
Considered one of the best data communications programs for the TI-99/4A. Complete with documentation.

**#58. PR BASE**  
The alltime most popular and widely used data base program for the TI-99/4A. A freeware program that is widely supported and updated.

**#59. GRAPH MAKER**  
A collection of the best programs for producing graphs and charts from your data. Exbasic and printer.

**#60. FREDDY**  
A fantastic game where you guide the hero through underground passages filled with danger. Nintendo quality, great graphics and fast action. One of the best we have ever seen!!!

**#61. THE MINE**  
A fast action game from F.R.G. that will keep you going for hours. Many screens and skills required.

**#62. DISK MANAGER II MODULE BACKUP**  
The complete TI Disk Manager II on Disk. For legal reasons it is only available to owners of the original module for backup use.

**#63. ASTROBLITZ/MAZOG**  
A pair of great games that continue where Parsec and Munchman leave off. Imagine Parsec with enemy space craft coming from in front and in back of your ship!!!

**#64. MAJOR TOM/SPACE STATION PHETA**  
A pair of great space games. These two are going to keep you in front of the 99/4A for hours. Great!!!

**#65. PERFECT PUSH**  
An all new space game where you assemble and launch a rocket ship in outer space while avoiding a space monster. This one is professional in every way...graphics, speed and action!!!

**#66. HEBREW TYPEWRITER**  
This program converts your TI-99/4A keyboard into a typewriter that displays Hebrew letters on the screen. Can also be printed when used in conjunction with screen dump program (included). Great for religious training or making your copy of the dead sea scrolls or ten commandments!

**#67. GENEALOGY**  
Now you can set up your family tree and store or print out the records. Great for keeping track of family relationships and records.

**#68. CHESS**  
The original computer chess game Sargon has been reprogrammed for the TI-99/4A. Now play chess with your computer. Documentation included. Exbasic autoloader.

**#69. COMPUTER PLAYER PIANO/KEYBOARD CHORD ANALYSIS**  
A unique music program which displays a piano on the screen and actually plays your selections.

**#70. TI RUNNER II**  
The very latest (and best) "runner" game based on TI Runner and Star Runner. Great action, graphics and entertainment.

**#71. KIDS LEARNING II**  
Two more disk sides loaded with the best in educational programs. Kids improve their math, spelling and comprehension skills while having fun.

**#72. CERBERUS**  
Fantastic space game from Germany. Pilot your ship through narrow and crooked channels in space without colliding. Great graphics and music.

**#73. CRYPTO (gram)**  
One of the best word games we have seen for any computer. Set up like a TV game show with great screen displays.

**#74. LABEL MAKER II**  
Make labels for holidays and special events. You compose the text and select the resident graphics for the occasion.

**#75. DISK CATALOGER**  
Now you can organize your disk files with this great utility. Files, sorts, and prints your records. Easy to use.

**#76. PROGRAMMING AIDS AND UTILITIES II**  
A collection of very useful material. Includes a program to convert basic to exbasic so your old basic programs will load & run in exbasic, even with graphics. Also includes two on screen diagnostic programs to test your keyboard and processor. A great merge utility is also on this disk.

**#77. MICROdex 99**  
A database program by Bill Gaskill which files and retrieves data such as magazine articles. A sample database is included.

**#78. ARTCON+ BY RAY KAZMER**  
ATTENTION GRAPHX AND TI ARTIST USERS!!! This program lets you convert Exbasic graphics to TI Artist and Graphx pictures. Also contains a new MAC-RLE (2) for converting from Artist to Graphx.

**#79. DM1000 V3.5**  
One of the most popular disk managers for the TI-99/4A. Originally a rip-off of the CorComp manager, it has been improved and refined by talented users all over the world. This version is deemed the most reliable to date and is far advanced over the TI Disk Manager II. Distributed by permission from CorComp.

**#80. BIRDWELL DISK UTILITY**  
A must if you are into programming and software development. Besides being a great disk manager, it has provision for copying sectors, comparing files and is menu driven. Complete with documentation.

**#81. HOME ACCOUNTING SYSTEM**  
A complete family & small business accounting system including a checkbook manager, budget analysis, mailing list and an inventory program. Complete with documentation. Easy to modify for specific needs.

**#82. CROSSWORD PUZZLES**  
This program from Australia creates a different puzzle each time you run it. Self contained with definitions and vocabulary taken from a leading crossword dictionary. Great crossword fun.

**#83. HOME APPLICATION PROGRAMS**  
A two disk side collection of useful programs for the home. Includes banking, cooking, home bar guide, utility records, and much much more. Something for everyone.

Send order and make checks payable to:

**TEX+COMP**  
P.O. BOX 33084 — GRANADA HILLS, CA 91344

TERMS: All orders are shipped on a cash basis. Payment must be received before we can ship. No COD orders. No international orders. No orders outside the continental United States. No orders outside the continental United States. No orders outside the continental United States.

AUTHORIZED DEALER



TEXAS INSTRUMENTS



24 Hour Order Line

**(818) 366-6631**

NOTE: Payment in full must accompany all orders. Credit Card orders must be paid by the time of shipment. Personal Checks require 10 days to clear before shipping. Add \$3.00 per disk.



# TEX+COMP

Celebrating Our Tenth Year

## FREEWARE

•• Public Domain and Shareware for the  
Texas Instruments TI-99/4A Computer.

Public Domain and Shareware  
Programs to Meet Your Every  
Computing Need.

ONLY **\$4.95** Per  
Disk



**BONUS**

FREE DELUXE DISK STORAGE  
CASE WITH EACH ORDER OF  
FOUR OR MORE DISKS!!!

### #84. GALACTIC BATTLE/SPY ADVENTURE

A pair of great commercial quality games from EB Software of TI Runner fame. Galactic Battle is a space "trek" type strategy game for one or more players. Spy Adventure is an adventure game that will keep you guessing for hours.

### #85. AUTOBOOT UTILITY

This utility which can be installed on a disk loads and runs or displays most files. Now you can have a disk with exbasic programs, Editor Assembler programs and TI Writer files and run or display them all from exbasic.

### #86. COLUMN TEXT III V3.2

A very useful utility for printing TI Writer and 99 Writer II files in separate spaced columns. Saves hours in producing a newsletter. Complete with documentation.

### #87. ARCHIVER III

This utility allows you to "pack" or combine several files into one for space utilization. A number of boards are sending files packed to save transmission costs. This utility will let you pack and/or unpack these files.

### #88. AUSSIE GAMES VOL 1

A collection of games from our friends down under. Includes a great card game and board game. Hours of fun and entertainment. Includes Matchmaker & TILLO.

### #89. PROCALC

This is an on screen calculator for decimal, hexadecimal conversions and much more. A must for the serious programmer.

### #90. JET CHECKBOOK MANAGER

This checkbook manager is considered the ultimate with every feature you can think of for keeping track of your checking account and keeping records of your spending for budget and tax purposes. Complete with documentation.

### #91. "THE MAZE OF GROC" (St. Valentine)

Ray Kazmer has created a great maze game with fantastic graphics and the characters from his now legendary "Woodstock" disk. Fun for all!!!

### #92. HOUSEHOLD INVENTORY

Written by 99/4 programming great Charles Ehninger, this prize winner originally sold for \$59.95. Keeps track of household, business or personal items by category and provides automatic updating for inflation etc. A must for tax and insurance records!

### #93. THE 1989 KBGB GIRLIE CALENDAR

This latest offering from programming master Ken Gilliland prints out a jumbo 12 month calendar with a knock-out centerfold pinup for each month. If you like our #14 Figure Study disk, you will flip over this one. For Adults Only!!! Exbasic & d/m printer.

### #94. GREAT 99/4A GAMES VOL. 111

If you have seen vols. 1 & 2 of this series you know we only provide the very best. This latest volume is also filled with a collection of great ones!

### #95. WEATHER FORECASTER

The weather predictions are amazingly reliable and accurate! A great game "Lawnmower" and a mini database are also included to make this disk a fantastic value.

### #96. STATISTICS & SORTING

Two great assembly utilities by John Clulow. STAT is a set of statistic routines for use in exbasic. SORT allows sorting by two separate fields and a choice of two types of sorts.

### #97. MEMORY MANIPULATOR

This powerful utility lets you explore the entire memory in your 99/4A system and take apart what you find. User friendly!

### #98. DAYS OF EDEN & DOORS OF EDEN

Two bible games (non-fiction) that work with the TI Adventure Module.

### #99. GREAT 99/4A GAMES VOL. IV

This disk features the works of J. Peter Hoddie. All of these games are of commercial quality and well worth the donation requested!

### #100. ASSULT THE CITY (T. of DOOM)

An exciting game for use with the Tunnels of Doom module. Several Exbasic bonus games are included.

### #101. ENCHANCED DISPLAY PACKAGE

This screen enhancement utility lets you do 40 columns, windowing, reverse scrolling, clock/alarm, and a whole host of other great tricks in exbasic. Fully documented.

### #102. COLOSSAL CAVES ADVENTURE

This classic adventure now available for the 99/4A is what led to the Zork series. Hours of text adventuring.

### #103. SORGAN, THE 99/4A ORGAN

This program which is currently selling for big bucks on module turns your 99/4A into an electronic organ. Sound effects, different instruments and voices, chord forms, color graphics with complete control of all.

### #104. C99 COMPILER AND LIBRARY

This two-sided (flippy) disk gets you into C programming with your 99/4A. Comes with a great collection of utilities such as text & graphics. (E/A)

### #105. KING'S CASTLE+

A great arcade style assembly game formerly offered on module. Also includes an EB "Trek" game and a collection of sprite & graphics from Tigercub's Jim Peterson.

### #106. QUEST (Dungeons & Dragons)

One of the best D&D games around! You must destroy the Dark Lord to free your homeland! Complete with documentation on disk.

### #107. STAR TREK MUSIC ALBUM

Ken Gilliland's music and graphics version of the TV theme and the three motion pictures. (Exbasic)

### #108. FUNPLUS BY JACK SUGHRUE

Fantastic disk packed with Funnelweb (#42) templates, utilities and prog. to augment and configure Funnelweb. Unbelievable collection of fantastic aids to make the best even better!

### #109. TI-WRITER MINI MANUAL

This disk prints out a five page TI Writer manual with everything you need to know to use TI Writer or the many clones such as 99Writer II. Additional aids for using this powerful word processor are included.

### #110. DISK + AID

A powerful disk sector editor formerly sold for \$20. Menu Driven and easy to use.

### #111. POP MUSIC & GRAPHICS

This exciting disk from Germany features music/graphics written in 100% assembly and what comes from the TI sound chip is sure to astound you.

### #112. INVOICE PACK

An excellent invoice preparation and printing program with instructions on how to modify it for your own business.

### #113. LABEL MAKER 3

A collection of label programs to create mailing and disk envelopes, disk labels and much more!

### #114. PANORAMA

A drawing and illustration program that compliments Graphx and TI Artist. A must for the serious 99/4A artist!

### #115. GRAPHICS DESIGN SYSTEM

A complete system for creating graphic screens in full color for your programs by J. Peter Hoddie. Fully documented.

### #116. FOURTH TUTORIAL

A lesson in FORTH programming on how to create graphics.

### #117. UNIVERSAL DISASSEMBLER

This powerful utility written in Forth allows disassembly of programs off disk in any format, in memory, and even off of P-Box cards. Very complete with some very unique features.

### #118. FAST TERM

One of the most popular and recommended of the 99/4A terminal emulator programs. Supports TE-11, ASCII, and X-Modem transfers, print spooling and more. Loads from Exbasic or E/A.

### #119. RAG LINKER

A utility for converting DIS/FIX 80 assembly object code files to PROGRAM image. This allows files to load faster and take up less space on disk. Full Doc

### #120. BITMAC

The original BITMAC is now available at \$4.95 with all original documentation. A powerful graphics program for the 4A which lets you print where you want, even over pre-existing text. Create great graphics in 16 colors, print text sideways, mirror image, upside down etc. etc. A must for anyone into 99/4A graphics. Comes with second bonus disk with utilities such as sign & banner makers. Even can computer generate your own signature!

### #121. SUPER YAHTZEE & WHEEL II

If you like Yahtzee this disk is for you. A great version written in high speed assembly. Also included is another version of Wheel of Fortune which also lets you create your own puzzles with a puzzle edit program included.

### #122. ADULT ADVENTURE

A truly adult adventure for use with the TI Adventure Module. Also included is a bonus adventure (not adult) "LOST GOLD" which is one of the better ones we have seen recently.

Send order and make checks payable to:

**TEX+COMP**

P.O. BOX 33084 — GRANADA HILLS, CA 91344

TERMS: All prices are suggested retail prices. Payment accepted by cash, check, or money order. Add \$3.00 shipping and handling \$5.00 minimum. Sales tax applicable in the state of California. Orders shipped by Priority Mail and available subject to change without notice. We reserve the right to limit quantities.

AUTHORIZED DEALER



TEXAS INSTRUMENTS



24 Hour Order Line

**(818) 366-6631**

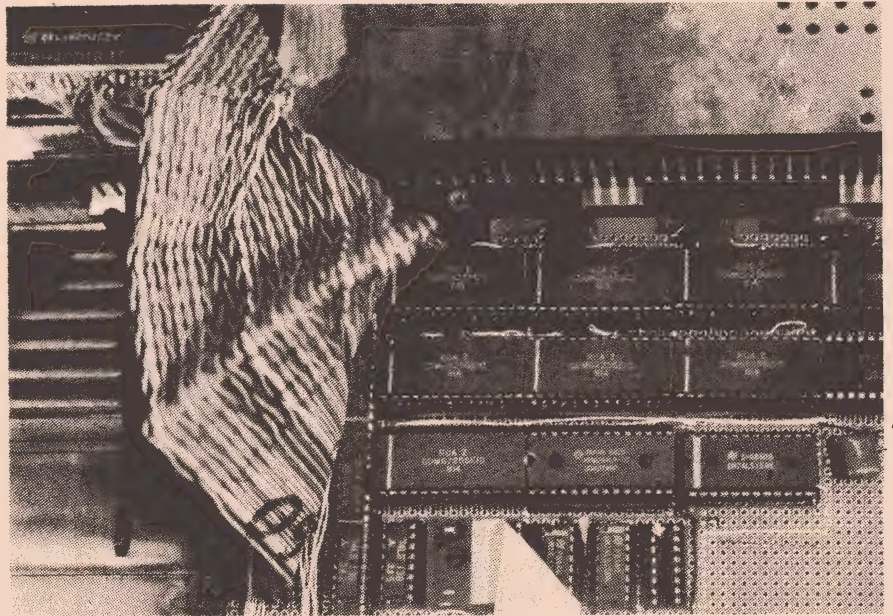
NOTE: Payment must be accompanied by cash, check, or money order. Immediate shipment. Personal checks require 10-15 days to clear. All orders add \$3.00 shipping tax.

pansion board fit in the top cover. (See Fig. 1)

At this point, the expansion board contains the 32K RAM, and most of a RAM-disk, with areas of the board set aside for the parallel port, which is the next hurdle to get over. My only concern is that, although the Hamsoft Module's parallel port works with a RAMdisk in the console, I don't know whether it will work in conjunction with an expansion box. Unfortunately, I did not have a connector that would allow me to plug in the Hamsoft as well as the expansion box for testing. That was something that would just have to wait until later.

## BACK AT THE RAMDISK

The schematic I used for the RAMdisk is a modified version of a standard RAM

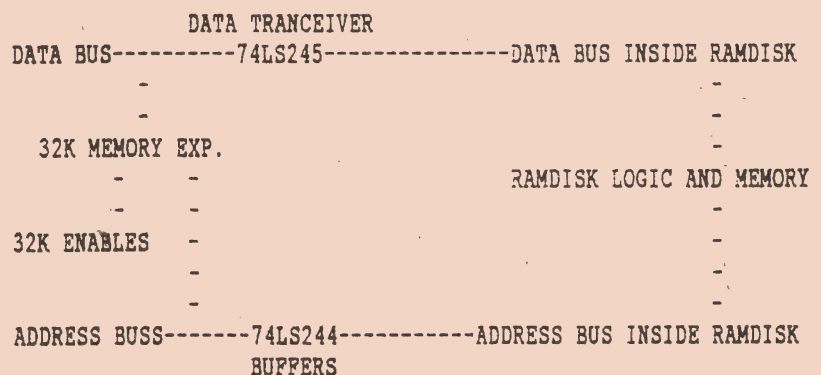


**Fig. 2: Expansion board showing cutout in board for support.**

There is no LED on the modified power supply, and I wanted to do something special, so I re-designed the LED for the RAMdisk, so that that one LED had two different colors in it. The red part is con-

### CRU SELECTION SWITCH

(See Page 27)



**Fig. 4: Interconnects within the console. (Console attaches to left side)**



Well, am I proud of myself! I managed

In test after test, including the TI diagnostics, Memtest, and Megtest, all tests indicate that there is no problem. After I loaded the version 7.3 RAMdisk Operating System (ROS) and John Johnson's RAMdisk Menu program, I started loading the RAMdisk's memory storage space. It was then, when I was about to announce to the world that I was successful, that disaster

I then tried a simple BASIC program which loaded with the standard RUN "DSK5.FILENAME" command, and that worked. Then, using the Editor/Assembler cartridge, I was able to load the text editor from Funnelweb, but after a document was

**(See Page 28)**

[illegible]

## PORTABLE TI—

(Continued from Page 27)

completed, I was unable to store it or, for that matter, load a text file from the RAMdisk.

Next, I tried Fast-Term, and that program seemed to run fine, but I was unable to fully test it — the portable did not have a serial port to test it on. A few more hours of testing did not render any consistent results except that whenever I connected the expansion box to the console, there was absolutely no problem. However, whenever I removed the expansion box, the strange problems reappeared. I couldn't help asking myself the question: What's going on here?

When I removed the disk controller card (dcc), with the PEB attached, the problems reappeared! I next tried leaving the dcc inside the PEB, but I disconnected the disk drives. I obviously had no disk access, but I didn't have the problem of crashing either; with this arrangement, the system seemed happy. I then thought back to the day I was at another user's house, and he showed me that he could load a program without a disk controller card. I called him, and he tested it for me again, this time more thoroughly. Now, when he ran the programs, he encountered the same problems I had; some programs ran fine, however. Strange!

I then tried to fool the computer by changing the CRU address of the RAM

disk to 1100, which is the standard disk controller CRU address (after separating the console from expansion box). That did not help.

What followed was 4-5 days of crazy tests, all of which were so inconclusive that I will not mention them here. This occurred about two weeks before the 1988 Chicago TI Faire, so I went to the Faire armed with schematics, drawings and as much documentation as possible, and talked with anyone who would listen.

### IT'S IMPOSSIBLE

At the Faire, my idea and my experimentation were met with various responses; though the words differed, the meaning was the same: "IT'S IMPOSSIBLE—IT CAN'T BE DONE." In more than a few instances, had I had not had my schematics and drawings, I seriously believe that I would have been dismissed as a crackpot.

I was not banking on the Faire alone as a source of answers to my problem. I sent off letters to virtually everyone who seemed to matter in the TI community, including Texas Instruments. In each letter, I asked whether I was in fact correct about the lack of a dcc causing the kind of problem that I was experiencing. I finally got a call from Ron Walters, in Ohio, who talked with me at length about my project, and that conversation was followed up with a 5-minute face-to-face conversation with Bud Mills, of Bud Mills Services, at the December Chicago Users' Group meeting. In our discussion, of this matter, Bud promised that he would do all that he could find a fix for this problem.

Well, exactly what was my problem? Here is my understanding of the problem that I was facing: The ROS is written to co-exist with the disk controller's Device Service Routine (DSR). When a disk system is installed in an expansion box, you lose 2K of RAM in the VDP area, and this is set aside for the DSR routine for handling the disk accesses. Apparently, the RAMdisk ROS works in conjunction with this disk DSR, and, by removing the disk controller, the ROS was attempting to communicate with a DSR that wasn't present. Therefore, it crashed.

I later received an answer, of sorts, from Texas Instruments, which I have copied

here for your reading pleasure.

"1. Install enough of the disk controller ROM (and supporting hardware) on board the computer to simulate the full capabilities for the disk controller in setting up the PAB." (Here I must admit that I do not know how much is enough.)

"2. Contact the author of the ROS to understand what parts of the disk controller ROM software it uses. Then, modify the ROS software to incorporate the missing segment. Mr. Janowski, I hope these suggestions are helpful in completing your project. The research (building sample circuits and disassembling ROM software) would be very extensive. We have reached the end of our expertise and will not be able to assist you any further in this matter."

As a result of this communication, I immediately started looking for this disk drive DSR in memory and found it with the Mini-Mem cartridge. In order to make an effective search of the machine's memory, I powered up the system and browsed the VDP memory, documenting what I found. I next powered down the system and removed the disk controller card. After returning power to the system, I browsed the VDP RAM again to see what was missing. Here are the differences that I found:

37D8	AA	3EEB	05	3FF5	05
37D9	3F			3FF6	4D
37DA	FF			3FF7	45
37DB	11			3FF8	4E
37DC	03			3FF9	55
37DD	02			3FFA	20
37DE	04			3FFB	20
37DF	50			3FFC	20
37E0	00			3FFD	20
37E1	04			3FFE	20
				3FFF	20

All other locations were 00, regardless of whether the dcc was installed or not. (The card, by the way, was a Myarc DSDD disk controller.)

**The third and final part of this series will be published next month.—Ed**

### MICROpendium disks

Programs published in MICROpendium since April 1989 are available on disk to subscribers. The cost is \$4 for a single month or \$40 for 12 months. All disk subscriptions start with April 1989 and are mailed on SS/SD floppies. Postage is included in the price. Payment is by check, money order or MasterCard/Visa.

Name \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_  
 State \_\_\_\_\_ ZIP \_\_\_\_\_  
 Amt. Enclosed \$ \_\_\_\_\_

CREDIT CARD ORDERS: Write credit card number and exp. date on separate piece of paper.



# Your Computer Deserves A Great Monitor

**TEX+COMP™** Proudly Introduces The

**MAGNAVOX  
8CM515**

**RGB/Composite  
Color Monitor 80**

**17% Larger Screen than Standard 12" Monitors** • 14" tube provides larger screen size without an appreciably larger footprint.

**RGB TTL, RGB Analog, Composite Video Inputs** • make monitor compatible with all three standard video signal types.

**Green Raster Display Switch** • emulating monochrome performance for text applications, this switch disables the monitor's ability to display anything other than green light — a feature normally found on more expensive products.

**Etched Faceplate** • the CRT face is treated with a special glare-reducing process to help eliminate eye fatigue caused by reflections from the monitor face.

**Dark Glass CRT** • the tube glass used in this product incorporates a special dark background material which helps to improve image contrast and reduce operator eye strain — a feature normally found on more expensive products.

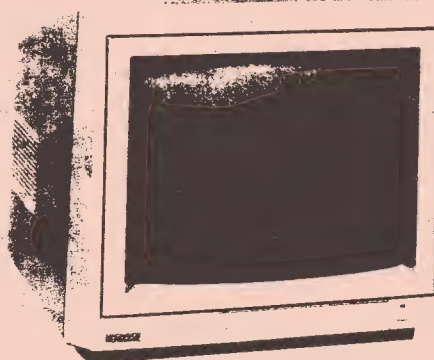
**640 Dots of Resolution (Horizontal)** • in RGB, the monitor system will display 640 dots of image resolution on each scan line, the minimum number required to display 80 characters.

**240 Lines of Resolution (Vertical)** • the monitor will produce 240 vertical scan lines, standard for RGB use.

**Displays 2000 Characters, 80 x 25** • this monitor system will display 25 lines of 80 characters each.

**Comb Filter on Composite Input** • when used with a composite input signal, the monitor's comb filter improves the resolution quality of the visual image.

**Line Level Audio Input** • provides convenient connection to a VCR or any device which generates a line level audio signal.



**Image Size and Position Controls** • located on the back panel, these controls allow the user to adjust both the size and position of any image displayed on the CRT, assuring compatibility with computer and other video devices.

**Built-in Tilt Stand** • allows the user to adjust the viewing angle to suit personal preference.

**Two Year Parts and Labor Warranty** • solid evidence that this is a reliable product, nationally supported by Magnavox.

THE MAGNAVOX 14" 8CM515 COLOR MONITOR IS BY THE FINEST COLOR MONITOR EVER AVAILABLE FOR THE TI-99/4A AND THE ONLY MONITOR THAT IS FULLY COMPATIBLE WITH EVERY TI-99/4A RELATED MODEL AVAILABLE INCLUDING THE BASIC 99/4A, THE MYARC GENEVE, THE TRITON TURBO, THE DIJIT & MEGATRONICS 80 COLUMN CARDS, NOT TO MENTION ALL OTHER AVAILABLE COMPUTERS. THE DISPLAY WITH THE TI-99/4A IS DYNAMITE AND WITH THE DIJIT 80 COLUMN CARD IT BOUGHT THE HOUSE DOWN AT THE TI-99/4A FEST WEST '89. ALSO HAS AN AUDIO OUTPUT FAR SUPERIOR TO WHAT HAS BEEN AVAILABLE. THIS MONITOR RETAILS FOR \$599 BUT TEX-COMP HAS PURCHASED AN ENTIRE TRUCK LOAD TO BRING YOUR PRICE DOWN TO \$279.95 AND WE EVEN THROW IN A HEAVY DUTY TI-99/4A MONITOR CABLE, A \$14.95 VALUE. COMES WITH A 2 YEAR NATIONAL FACTORY WARRANTY FROM MAGNAVOX (NORTH AMERICAN PHILLIPS) WHICH IS THE LONGEST IN THE INDUSTRY.

**\$ 2 7 9** 95+\$10S&H

**TEX+COMP™**

AMERICA'S NUMBER ONE  
TI COMPUTER RETAILER



Charge-it On Your  
Visa or MasterCard



ORDER BY PHONE  
24 HOURS A DAY

7 Days a Week!

**(818)**

P.O. Box 33084,

TERMS: All prices F.O.B. Los Angeles. For fastest service send cashiers check or money order. Personal checks require up to 15 days to clear. Prices reflect a 3% discount for cash or approved check. Add 3% for Credit Card orders. Prices and availability are subject to change without notice. We reserve the right to limit quantities. California orders add 6.5% sales tax.

ORDER BY PHONE  
24 HOURS A DAY  
7 Days a Week!

**(818) 366-6631**

P.O. Box 33084, Granada Hills, CA 91344

## LOADERS, MODULAR PROGRAMMING, LINKAGES & OVERLAYS

# Overlays using Extended BASIC

This is the fifth and final installment of a series on loaders, linkages and overlays.—Ed.

By MERLE VOGT

Overlays with Extended BASIC are much different from those described last month. There is no UTLTAB to keep track of addresses as was used by Mini-Memory or the Editor/Assembler.

Extended BASIC keeps high RAM, >A000 and up, for itself. The primitive initialization pointers are set to use low RAM space to contain any loaded modules.

The resulting address table contains only two entries: FSTLOW and LSTLOW.

FSTLOW at >2002 contains >24F4

LSTLOW at >2004 contains >4000

The Extended BASIC loader observes the following procedure when a CALL LOAD command is executed:

A. It places the program code into low RAM starting at FSTLOW, >24F4.

B. It updates FSTLOW to reflect length of the module.

C. It subtracts 8 from LSTLOW, at >2004, getting address >3FF8.

D. It places the module name, and entry address in the space >3FF8 through >3FFF. Thus the Extended BASIC loader creates REF/DEF table entries downwards, as we are accustomed to seeing it done. Note that the Extended BASIC loader will

not process any references, REFs. You cannot use them in any assembly modules to be used with Extended BASIC.

Considering the above addressess, we can see that allowing space for some REF/DEF table entries, we have about >3FE0->24F4 = >1AFC, or 6808 bytes of space in low RAM for modules. So we cannot load many, or very large, modules using Extended BASIC as it is fundamentally structured.

The use of high RAM by Extended BASIC is related to how much area is demanded by data, arrays, strings, etc. in running the program. By keeping the Extended BASIC program minimal, using it strictly as a driver and loaded of assembly modules we then can use a large portion of high RAM for overlay modules. I have experimented and believe that the area >A000 through >F000 generally can be used without conflicts.

We can create and assemble two types of modules: relocatable and absolute origin. With Extended BASIC, both are most feasible. The Extended BASIC loader normally expects to be fed relocatable modules, which it loads into low RAM, for which it updates FSTLOW, LSTLOW and the REF/DEF table. Where we must run programs that exceed low RAM space, absolute origin modules in high RAM are required.

The Extended BASIC loader can handle absolute origin modules, but the whole procedure changes. It does only two things:

A. It loads the module into RAM at the address on the AORG statement in the module.

B. It places the name, and address, of the module into the REF/DEF table and updates LSTLOW to reflect it.

Note that you can "AORG" into low RAM for modules, but it demands strict program organization.

Let us review:

A. You cannot use any REF to a DEF in any other module.

B. Instead the EQU (EQUate) must be used.

C. It will blindly overlay modules on top of module you may still be using if you get

careless.

D. The AORG addresses, timing of CALL LOAD commands, length of modules, etc. must be strictly controlled.

E. You must erase names of used modules from the REF/DEF table before loading more modules.

F. You must update the LSTLOW address to reflect the cleared REF/DEF table space.

G. You must not erase any REF/DEF table entry still needed.

All the above makes it appear that using overlay procedure is excessively complex. Yes and no. Complex, yes. But it is powerful and flexible. You can run programs of any size. You can reload and rerun modules as needed. The *cleanup* steps discussed above can be put in a small module and called as each overlay is needed. Then each overlay module can exit into the cleanup module. It, in turn, exits back to Extended BASIC which loads the next step in the chain. The cleanup module is loaded first and its entry in the REF/DEF table must not be erased.

Alternately, you can use a routine in the Extended BASIC code to do the cleanup, as outlined last month. You would execute the procedure before each load of a new module. Note that the loader manages the REF/DEF table as a *stack*, in a primitive way. The cleanup routine has to *unstack* the table so that LSTLOW points to space for the new entries.

In the following paragraphs, I will set up a program system which copies a large part of the one shown last month.

A. Routes AAAAXX, BBBBXX and CCCCXX are similar to AAAAMM from last month, except that EQUates replace all REFs. We will have to add our own standalone scroll routine. Extended BASIC does not have a GPLLNK function. This module must be loaded first and never overlaid. (See program SCROLL.)

B. For educational purposes, I will delete the routine 6000 from last month, which resets pointers, and give you an assembly module. It is coded to fit Extended BASIC requirements. It also must be loaded and

(See Page 31)

**THE BUNYARD  
HARDWARE MANUAL  
FOR THE  
TI 99/4A**



- CONSOLE DESIGN
- CUSTOM CHIP OPERATION
- TMS 9900 H/W ORGANIZATION
- TMS 9900 INSTRUCTION SET
- INTERFACING PITFALLS
- CONSOLE SCHEMATICS
- PCB CARD DESCRIPTION
- GROM SIMULATOR DESIGN
- EXTENDED BASIC MODULE DESCRIPTION & SCHEMATICS

US \$21.95 CHECK OR MONEY ORDER  
CANADA & FOREIGN \$26 US FUNDS  
VOLUME RATES AVAILABLE

SEND ORDER TO:

**THE BUNYARD GROUP  
PO BOX 62323, COLO. SPRINGS,  
COLORADO 80962-2323**



**LOADERS, MODULAR PROGRAMMING, LINKAGES & OVERLAYS**

(Continued from Page 30)

never overlaid.

C. The Extended BASIC MASTER control program is similar to the MASTER program used last month. Some CALL LOAD commands are added and routine 6000 is deleted.

Here is a summary of the program structure:

A. SCROLL module. Loaded and never disturbed.

B. RESET module. Loaded and never disturbed.

C. Modules AAAAXX, BBBBXX and CCCCXX are all overlays.

D. Extended BASIC MASTER control program.

SCROLL is an example of how to make a standalone scrolling routine in assembly. You can use this in the next 500 program systems you write. The action of scrolling is nothing but moving each line up one line and erasing line 24 to blanks. Use VMBR to read a line, then VMBW to write it one line higher on the screen, and loop 23 times. Then use VMBW to blank out line 24. ( See Fig. 1.)

Module RESET resets the pointers to make the loader put modules AAAAXX, BBBBXX and CCCCXX into low RAM at address >24F4. This pointer (FSTLOW) in in RAM >2002. It must be reset to the value >24F4.

Then the REF/DEF table start address pointer, LSTLOW, at address >2004, must be reset to the value >3FF0. We must reset it to this value to avoid destroying the DEF entries for SCROLL and RESET. Then the DEF table entry for the overlay modules must be erased each pass. (See Fig. 2).

The Extended BASIC Master Control Program is coded somewhat like the control program in last month's installment. It must load modules SCROLL and RESET before starting the overlay steps.

**100 REM RUNNING MULTIPLE OVERLAYS IN X-BASIC ENVIRONMENT !047**

**110 CALL INIT !157**

**120 NEXTRTN=1 !235**

**130 CALL LOAD("DSK1.PT5/SCLOBJ")!210**

**140 CALL LOAD("DSK1.PT5/RESO**

(See Page 32)

```

S1      AORG >A000
S2      DEF  SCROLL
S3      SCROLL BLWP @SCRL
S4      B      *R11
S5      VMBR  EQU  >202C
S6      VMBW  EQU  >2024
S7      WS    BSS  32
S8      LINE  BSS  32
S9      CLER  TEXT '
S10     SCRL  DATA WS,DOIT
S11     STAT  EQU  >837C

S12     DOIT  LI    R3,>20
S13     LI    R4,0
S14     LI    R5,23

S15     LOP23 MOV   R3,R0
S16     LI    R1,LINE
S17     LI    R2,32
S18     BLWP  @VMBR
S19     MOV   R4,R0
S20     LI    R1,LINE
S21     LI    R2,32
S22     BLWP  @VMBW
S23     AI    R3,32
S24     AI    R4,32
S25     DEC   R5
S26     JNE   LOP23

S27     MOV   R4,R0
S28     LI    R1,CLER
S29     LI    R2,32
S30     BLWP  @VMBW
S31     CLR   @STAT
S32     RTWP
S33     END

```

**Program explanation (SCROLL)**

Line No.	Explanation
S1	Set origin to AORG >A000 in high RAM
S2	DEFines the module name
S3-S4	Start the run
S5, S6, S11	Set up needed EQUates
S7-S10	Set up data and text items. (Line S9 has 32 spaces)
S12	Pointer to screen line 2
S13	Pointer to screen line 1
S14	Loop counter value 23
S15-S26	Scroll up one line, increment counters R3, R4 and test for finish
S27-S30	Blank line 24 of screen
S31-S32	Clear status and exit

Fig. 1 (Line numbers are for reference only, do not enter them)

## LOADERS, MODULAR PROGRAMMING, LINKAGES & OVERLAYS

(Continued from Page 31)

```

BJ")!218
150 ON NEXTRTN GOTO 1000,200
0,3000,4000 !197
160 REM!154
1000 REM RESTORE THE POINTER
S !115
1010 CALL LINK("RESET")!083
1020 REM GET MODULE AAAAXX.
!130
1030 CALL LOAD("DSK1.PT5/AA
OBJ")!202
1040 REM NOW RUN IT. !174
1050 CALL LINK("AAAAXX")!133
1060 NEXTRTN=3 !237
1070 GOTO 150 !229
2000 REM RESTORE THE POINTER
S !115
2010 CALL LINK("RESET")!083
2020 REM GET MODULE BBBBXX !
088
2030 CALL LOAD("DSK1.PT5/BB
OBJ")!204
2040 REM RUN IT !108
2050 CALL LINK("BBBBXX")!137
2060 NEXTRTN=4 !238
2070 GOTO 150 !229
3000 REM RESTORE THE POINTER
S !115
3010 CALL LINK("RESET")!083
3020 REM GET MODULE CCCCXX !
092
3030 CALL LOAD("DSK1.PT5/CC
OBJ")!206
3040 REM RUN IT !108
3050 CALL LINK("CCCCXX")!141
3060 NEXTRTN=2 !236
3070 GOTO 150 !229
4000 REM END OF JOB !065
4010 DISPLAY "END OF OVERLAY
JOB": : !099
4020 STOP !152

```

Here I will let you complete routine 3000. It refers to module CCCCXX and DSK1.PT5/CXOBJ. NEXTRTN equals 2.

Routine 4000 is the same as in last month's master control program (Page 17, June 1989).

Module AAAAXX (Fig. 3) is different in several areas from the code shown in AAAAMM (Page 16, June 1989). Note that the AORG should not be used in this module. So the Extended BASIC loader will load the module into low RAM at the default address of >24F4.

R101		AORG	>A200
R102		DEF	RESET
R103	RESET	BLWP	@RSET
R104		B	*R11
R105	WS	BSS	32
R106	RT2002	DATA	>24F4
R107	RT2004	DATA	>3FF0
R108	STAT	EQU	>837C
R109	RSET	DATA	WS,RST
R110	RST	MOV	@RT2002,@>2002
R111		MOV	@RT2004,@>2004
R112		LI	R3,8
R113		LI	R4,>3FE8
R114	RLOP	CLR	*R4+
R115		DECT	R3
R116		JNE	RLOP
R117		CLR	@STAT
R118		RTWP	
R119		END	

### Program explanation (RESET)

Line No.	Explanation
R101	Absolute origin to >A200, past module SCROLL
R102	DEFine name RESET
R103-R104	Start execution
R105-R107	Workspace and values for reset pointers. Note value in item RT204. We cannot reset location >2004 to >4000 because that would destroy the REF/DEF table entries for SCROLL and RESET modules.
R108-R109	BLWP vectors
R110-R111	Reset pointers for FSTLOW and LSTLOW
R112-R116	Clears one entry from REF/DEF table. These would be for AAAAXX, BBBBXX and CCCCXX
R117-R118	Exit module

Fig. 2

Module BBBBXX can be made from the code of AAAAXX by changing four lines, and saving the result with the new name.

```

1      DEF    BBBBXX
2  BBBBXX  BLWP  @AA2
7  MA      TEXT  'MESSAGE FROM
                BBBBXX '
8  MI      TEXT  'PASSING CONTROL
                TO EOJEJ'

```

Similarly, module CCCCXX can be made by changing the same four lines again, and saving that result.

```

1      DEF    CCCCXX
2  CCCCXX  BLWP  @AA2
7  MA      TEXT  'MESSAGE FROM
                CCCCXX '

```

```

8  MI      TEXT  'PASSING CONTROL
                TO BBBBXX'

```

Here is a summary of the module disk names I used to set up this program package. You may change them if mine are confusing to you.

### Main XBASIC module

DSK1.PT5/MAINXB

### SCROLL and RESET modules

DSK1.PT5/SCROLL

DSK1.PT5/SCLOBJ

DSK1.PT5/RESET

DSK1.PT5/RESOBJ

Modules AAAAXX, BBBBXX &amp; CCCCXX

(See Page 33)



# LOADERS, MODULAR PROGRAMMING, LINKAGES & OVERLAYS

(Continued from Page 32)

DSK1.PT5/AAAAXX

DSK1.PT5/AAXOBJ

DSK1.PT5/BBBBXX

DSK1.PT5/BBXOBJ

DSK1.PT5/CCCCXX

DSK1.PT5/CCXOBJ

Here is the procedure for the whole package: Use the Editor/Assembler editor to create the source code for the five assembly modules and save them as follows:

DSK1.PT5/SCROLL

DSK1.PT5/RESET

DSK1.PT5/AAAAXX

DSK1.PT5/BBBBXX

DSK1.PT5/CCCCXX

Then load the assembler and create the five object modules and save them as follows:

DSK1.PT5/SCLOBJ

DSK1.PT5/RESOBJ

DSK1.PT5/AAXOBJ

DSK1.PT5/BBXOBJ

DSK1.PT5/CCXOBJ

Then load Extended BASIC and create the MAIN XBASIC module and save it as PT5/MAINXB.

## EXECUTING THE SYSTEM

Load and run MAINXB. The message from modules AAAAXX, then from CCCCXX then from BBBBXX then from end of job should scroll up the screen.

For example:

**Step 1.** Load modules AAAA, BBBB and CCCC.

**Step 2.** Overlay CCCC only with module FFFF.

**Step 3.** Overlay BBBB and FFFF with a larger module EEEE.

**Step 4.** Finally, overlay AAAA and EEEE with module GGGG.

Do not forget that the REF/DEF table is a *stack* structure, working downwards in address locations. The module names must be cleared, as required, going upwards. The LSTLOW address pointer must be adjusted to reflect the un-stacking.

Consider the above imaginary procedure, in tabular form.

REF/DEF ADDRESS	ENTRIES STEP 1	ENTRIES STEP 2	ENTRIES STEP 3	ENTRIES STEP 4
>3FF8	AAAA	AAAA	AAAA	AAAA
>3FF0	BBBB	BBBB	EEEE	----
>3FE8	CCCC	FFFF	----	----
>3FE0	----	----	----	----

```

1      DEF      AAAAXX
2  AAAAXX  BLWP   @AA2
3      B        *R11
4  VMBW    EQU    >2024
5  STAT    EQU    >837C
6  SCROLL  EQU    >A000
7  MA      TEXT   'MESSAGE FROM AAAAXX '
8  M1      TEXT   'PASSING CONTROL TO CCCCXX'
9  OFFSET  DATA  >6060
10 WS      BSS     32

11 AA2     DATA   WS,AA4
12 AA4     LI      R3,MA
13         LI      R4,46
14 AA5     A        @OFFSET,*R3+
15         DECT    R4
16         JNE     AA5

17         LI      R1,MA
18         LI      R2,20
19         BL      @ALINE
20         LI      R1,M1
21         LI      R2,26
22         BL      @ALINE

23         CLR     @STAT
24         RTWP

25 ALINE   MOV     R11,R10
26         LI      R0,>2E0
27         BLWP    @VMBW
28         BL      @SCROLL
29         B        *R10
30         END

```

## PROGRAM EXPLANATION (AAAAXX)

Line No.	Explanation
1	DEF module name
2-3	Start the run
4-6	Are EQUates needed
7-10	Are data and text items
11-16	Add offset value (= >60) to text messages to make them displayable in BASIC
17-22	Display the messages
23-24	Clear status and exit
25-29	Displays one line on screen and scrolls

Fig. 4

## SEQUENCE OF OPERATIONS AND PROGRAM CODE

Here is the code and explanation for an Extended BASIC program that can be used to run the overlay system (all addresses and module lengths are assumed values) :

### STEP 1 PROCEDURE

**A.** Module AAAA, relocatable, length >1A00 bytes, entry address (default) >24F4. Occupies all of low RAM space, >24F4 through >3EF4.

**B.** Module BBBB, absolute, AORG >A0000, length >2200 bytes. Occupies (See Page 34)

# LOADERS, MODULAR PROGRAMMING, LINKAGES & OVERLAYS

(Continued from Page 33)

high RAM space &gt; A000 through &gt; C200.

Module CCCC, absolute; AORG  
> C200, length > 3600 bytes. Occupies  
high RAM space > C200 through > F800.  
No more high RAM space left.

D. Extended BASIC code.

1000 CALL LOAD("DSK1.AAAAOBJ  
T")1010 CALL LOAD("DSK1.BBBBOBJ  
T")1020 CALL LOAD("DSK1.CCCCCOBJ  
T")

E. REF/DEF table at this point.

&gt; 3FF8='AAAA', &gt; 24F4

&gt; 3FF0='BBBB', &gt; A000

&gt; 3FE8='CCCC', &gt; C200

LSTLOW=&gt;3FE8

F. X BASIC code continued.

1030 REM STARTING THE RUN IN  
MODULE CCCC

1040 CALL LINK("CCCC")

G. End of run for Step 1.

G1. Erase REF/DEF table entry for  
module CCCC.

1900 REM CCCC WAS AT &gt; 2FE8

1910 DEFF=3\*4096+15\*256+15\*1  
6+81920 CALL LOAD(DEFF,0,0,0,0,  
0,0,0,0)

G2. Reset pointer in LSTLOW.

1930 REM LSTLOW IS AT &gt; 2004

1940 LSTLOW=2\*4096+4

1950 REM NEED &gt; 3F F0

1960 G=3\*16+15

1970 H=15\*16

1980 CALL LOAD(LSTLOW,G,H)

## STEP 2 PROCEDURE

A. Load module FFFF.

2100 REM LOAD MODULE FFFF

2110 CALL LOAD("DSK1.FFFF0BJ  
T")2120 REM MODULE FFFF LOAD IN  
TO RAM AT > C200

B. REF/DEF table at this point.

&gt; 3FF8='AAAA', &gt; 24F4

&gt; 3FF0='BBBB', &gt; A000

&gt; 3FE8='FFFF', &gt; C200

LSTLOW=&gt;3FE8

C. Run FFFF.

2140 REM RUN FFFF

2150 CALL LINK("FFFF")

D. End of run of FFFF. Now we need  
to erase REF/DEFs for BBBB and FFFF.2800 REM ERASE REF/DEF FOR B  
BBB AND FFFF. START AT > 3FF02810 DEFF=3\*4096+15\*256+15\*1  
6

2820 REM ERASE BBBB

2830 CALL LOAD(DEFF,0,0,0,0,  
0,0,0,0)

2840 REM ERASE FFFF

2850 DEFF=DEFF-8

2860 CALL LOAD(DEFF,0,0,0,0,  
0,0,0,0)

E. Reset LSTLOW.

2900 REM RESET LSTLOW, HERE  
TO > 3FF82910 REM LSTLOW POINTER AT >  
2004. G STILL = > 3F

2920 REM NOW NEED H = &gt; 3F

2930 H=15\*16

2940 CALL LOAD(LSTLOW,G,H)

F. Status at this point. REF/DEF table.

&gt; 3FF8='AAAA', &gt; 24F4

LSTLOW=&gt;3FF8

## STEP 3 PROCEDURES

A. Load module EEEE.

3100 REM LOAD MODULE EEEE

3110 CALL LOAD("DSK1.EEEE0BJ  
T")3120 REM MODULE EEEE LOADS I  
NTO RAM AT > A000

B. REF/DEF table at this point.

&gt; 3FF8='AAAA', &gt; 24F4

&gt; 3FF0='EEEE', &gt; A000

LSTLOW=&gt;3FF0

C. Run module EEEE.

3140 REM RUN EEEE

3150 CALL LINK("EEEE")

D. End of run EEEE. Now erase

REF/DEFs for AAAA and EEEE.

3800 REM ERASE REF/DEF FOR A  
AAA AND EEEE3810 DEFF=3\*4096+15\*256+15\*1  
6+8

3820 REM ERASE AAAA

3830 CALL LOAD(DEFF,0,0,0,0,  
0,0,0,0)

3840 REM ERASE EEEE

3850 DEFF=DEFF-8

3860 CALL LOAD(DEFF,0,0,0,0,  
0,0,0,0)

E. Reset LSTLOW, now back to &gt; 4000.

3900 REM RESET LSTLOW VALUE.  
TO > 40003910 REM LSTLOW POINTER STIL  
L > 2004

3920 G=4\*16

3930 CALL LOAD(LSTLOW,G,0)

3940 REM NOW RESET LSTLOW BA  
CK TO > 24F4

3950 G=2\*16+4

3960 H=15\*16+4

3970 REM LSTLOW POINTER IS >  
2002, = 8194

3980 CALL LOAD(8194,G,H)

## STEP 4 PROCEDURE

A. Load module GGGG. GGGG is  
relocatable, entry at > 24F4, length  
> 1A00 bytes, occupies low RAM > 24F4  
through > 3EF4.

4000 REM LOAD GGGG

4010 CALL LOAD("DSK1.GGGG0BJ  
T")

B. REF/DEF table at this point.

&gt; 3FF8='GGGG', &gt; 24F4

LSTLOW=&gt;3FF8

C. Now run GGGG.

4150 CALL LINK("GGGG")

D. Run of GGGG terminates the  
operation.

## Fourth annual Seattle TI99/4A meet set

The fourth annual TI99/4A Seattle Con-  
vention is scheduled for Sept. 23-24 in  
Kenmore, Washington.

Location is the Kenmore Flea Market in  
Kenmore Square, open from 10 a.m. to  
4:40 p.m. each day.

To reserve vendor space, limited to 12  
tables, call Barb Wiederhold at (206)  
361-0799 (voice) or (206) 361-0895. Cost  
is \$15 per table.

Admission to the flea market is 50 cents  
at the door and admission to the conven-  
tion area is \$2.

According to Cynthia Becker, a conven-  
tion organizer, attendees may bring disks  
or buy them at the user group booths. Two  
tables will be reserved for user groups, who  
need to register for space also, she says.

A Friday night reception is scheduled in  
connection with the convention. Tickets are  
\$2.50 per person. A Saturday night bowl-  
ing party is scheduled at \$10 per person.  
Both these events are for adults only.

"Slumber party" accommodations are  
available for convention attendees, with  
males in an apartment recreation room and  
women in the apartment across the hall.  
Participants need to register for these  
accommodations by contacting Wiederhold  
at the above telephone numbers, according  
to Becker.



## A CHARACTER GENERATOR FOR GENEVE & TI99/4A

# Buffer of 99/4A can't handle this program in one bite

This is the second of three installments of CHARA1FIX, which began last month. The program, by Wayne Stith, is used to redefine characters in the CHARA1 file used with TI-Writer, MY-Word and other programs. After creating characters, the program saves the result as a CHARA1 file.

The assembly language program requires a CHARA1 file, memory expansion and disk system. The program code is entered using MY-Word, TI-Writer or the Editor-Assembler editor. The program runs on the 99/4A as well as the Geneve. However, it is not compatible with CorComp disk controllers at this time. MICROpendium will publish a patch for CorComp users when it becomes available. An explanation of how to use the program was published last month.

Because of the length of the program as it appears here, it cannot be loaded completely into the Editor/Assembler buffer using the 99/4A. However, the author has outlined two methods that may be used to compensate for this.

### METHOD ONE

With this method, the user will save the program as two files. Type in as much of the program as possible using the Editor/Assembler editor, TI-Writer or Funnelweb. When the buffer is full, delete the last few lines to gain buffer space and add the following line:

COPY "DSK1.FILE2"

or whatever the second file will be called. Then save the current buffer contents as DSK1.FILE1, or whatever name you decide to use. Then purge the buffer and pick up with the source code where you left off and enter it and save it using FILE2, or whatever name you selected.

If the buffer fills up again, repeat the procedure using

DSK1.FILE3, etc. The source code files will be chained in this way. Assemble the file DSK1.FILE1.

### METHOD 2

This is the way the author does it when he has a gigantic source file to type:

Create a "copier" or master file like this:

COPY "DSK1.FILE1"

COPY "DSK1.FILE2"

COPY "DSK1.FILE3"

Use as many filenames as you need. Then type in one-third of the source code and save it as DSK1.FILE1, the second third as DSK1.FILE2, etc. Assemble the file DSK1.COPIER (or whatever you called the master file).

An extension to this idea is the following:

```
DEF      SFIRST,SLAST,SLOAD,START (or whatever)
SFIRST
SLOAD
START
```

COPY "DSK1.FILE1"

COPY "DSK1.FILE2"

COPY "DSK1.FILE3"

SLAST      END

The latter extension requires a bit of careful looking at the source code to make sure that the DEF and various label statements are not duplicated anywhere.

Regardless of the method, the END statement should appear *after* all the source code will have been "seen" by the assembler. With the COPY directive (see E/A manual) the TI assembler is a powerful tool, as it can assemble dozens of files and generate many more K of code than the TI can actually handle.

## CHARA1FIX

<pre> 0554 0555 * Move up. 0556 0557 UP    MOV @LINE#,R5    On line # ? 0558      JEQ UP1          Yes 0559 0560      AI R0,-32          No, subtract 32 from cursor location 0561      DEC @LINE#         Adjust grid line pointer 0562      JMP PRESC1         Start over 0563 0564 UP1    MOV @SEVEN,@LINE# Set pointer to line 7 0565      AI R0,7*32          Point to a position on bottom line 0566      JMP PRESC1         Start over 0567 0568 * Move down. 0569 0570 DOWN   MOV @LINE#,R5 0571      CI R5,7            On bottom line ? 0572      JEQ DOWN1          Yes </pre>	<pre> 0573 0574      INC @LINE#         Add 1 to grid line pointer 0575      AI R0,32            Add 32 to cursor location 0576      JMP PRESC1         Start over 0577 0578 DOWN1  CLR @LINE#       Set pointer to line # 0579      AI R0,-224          Point cursor to a position on top line 0580      JMP PRESC1         Start over 0581 0582 * FCTN-7 was pressed for the help screens... 0583 0584 FCTN7  CLR @83C4         Kill ISR hook 0585      BLWP @HELP          Call HELP routine 0586      LI R3,MYINT1        Restore interrupt 0587      MOV R3,@83C4 0588      JMP PRESC1         Pick up where we left off 0589 0590 * &lt;ENTER&gt; pressed. Change white space ('pixel') to black or vice versa. </pre>
---	--

(See Page 36)

## CHARAIFIX—

(Continued from Page 35)

```

#591
#592 ENTER BLWP @VSBW      Read the current screen location
#593
#594 * The possible codes returned to R1 are >00 (white) and >08 (black)
#595
#596     MOVW R1,R1          White space ?
#597     JEQ ENT1            Yes
#598     CLR R1              No, load >00
#599     JMP ENT2
#600
#601 ENT1 LI R1,0*256       Load >08 (0*256 is the same as >000)
#602 ENT2 BLWP @VSBW       Write new value
#603
#604 * Update screen displays elsewhere
#605
#606     BLWP @BOXRD         Read the grid's values
#607     BLWP @LITTLE        Show little character
#608     BLWP @HEXD15        Show new hex string
#609     JMP RIGHT           Move the cursor one space to the right
#610
#611 * FCTN-6 pressed, show the next sequential character
#612
#613 FCTN6 INC @CURCHR       Increment current character number
#614     C @CURCHR,@HIGHCH   Too high ?
#615     JLE FCTN6A          No
#616
#617     CLR @CURCHR         Yes, start at ASCII 0
#618 FCTN6A B @MAIN1        Start over with fresh screen
#619
#620 * FCTN-4 pressed, show the next lower character
#621
#622 FCTN4 MOV @CURCHR,R5
#623     DEC R5              Decrement current character number
#624     CI R5,256           Gone too far ? (Subtracting 1 from 0 would be >FF
#625     JLE FCTN4A          No
#626
#627     MOV @HIGHCH,R5      Yes, start at highest allowable character
#628
#629 FCTN4A MOV R5,@CURCHR   Store new value
#630     JMP FCTN6A          Update entire screen with new character
#631
#632 * FCTN-9 pressed, switch to hex mode after setting flag
#633
#634 FCTN9 SETO @MODE        Set flag
#635
#636 * The following routines handle keypresses while in the hex string
#637
#638 MODE2 LI R0,520         Point to left end of hex line
#639 PRESC2 BLWP @VSBW       Read in current value
#640
#641     MOV @FIVE,@INTREG+20 Set up interrupt timer
#642     LI R3,MYINT1
#643     MOV R3,@83C4         Load ISR hook
#644
#645 SCAN2 BL @KK            Scan keyboard
#646
#647     BLWP @VSBW          Display current value
#648     MOVW @8375,R3        Fetch new value
#649
#650 * Check for acceptable codes
#651
#652     LI R6,CODES          Point to list of codes
#653     LI R7,JMPTB2         Point to branch-address table
#654
#655 CHECKA MOVW *R6+,R2      Fetch code to check
#656     JEQ CHAR             If zero, entire list has been checked
#657
#658     CB R3,R2             Code match ?
#659     JEQ CHECKB           Yes
#660     INCT R7              No, add 2 to pointer because this is DATA
#661     JMP CHECKA          Check some more
#662
#663 CHECKB MOV *R7,R7       Fetch table address
#664     B *R7               Branch to that address
#665
#666 * The keypress must be some other character; make sure it is within
#667 * the proper range.
#668
#669 CHAR LI R4,HEX          Point to displayable hex code table
#670 CHAR1 CB R3,*R4+        Match ?
#671     JEQ CHAR2           Yes
#672     CI R4,HEX+16        Gone far enough ?
#673     JNE CHAR1           No
#674     JMP SCAN2          Yes, scan keyboard again
#675
#676 CHAR2 MOVW R3,R1
#677     BLWP @VSBW          Display new value
#678
#679     BLWP @HEXWR          Update hex string
#680     BLWP @BOXWRT         Update grid
#681     BLWP @LITTLE        Show little character
#682     JMP RX              Move cursor to the right
#683
#684 * Move left.
#685
#686 LL CI R0,520           Already at the far left ?
#687     JEQ PRESC2          Yes, scan again
#688     DEC R0              No, subtract 1 from cursor location
#689     JMP PRESC2          Scan again
#690
#691 * Move right.
#692
#693 RX CI R0,520+15        Already at the far right ?
#694     JEQ PRESC2          Yes, scan again
#695     INC R0              No, add 1 to cursor location
#696     JMP PRESC2          Scan again
#697
#698 * FCTN-7 pressed for help screens
#699
#700 F7 CLR @83C4            Kill ISR hook
#701     BLWP @HELP           Call HELP routine
#702     LI R3,MYINT1
#703     MOV R3,@83C4         Restore ISR hook
#704     JMP PRESC2          Scan again
#705
#706 * FCTN-6 pressed, show next higher character
#707
#708 F6 INC @CURCHR          Increment current character number
#709     C @CURCHR,@HIGHCH   Higher than allowed ?
#710     JLE F6A             No
#711
#712     CLR @CURCHR         Yes, start with ASCII 0
#713 F6A B @MAIN1           Start over with fresh screen
#714
#715 * FCTN-4 pressed, show next lower character
#716
#717 F4 MOV @CURCHR,R3
#718     DEC R3              Subtract 1 from current character number
#719     CI R3,256           Gone too far ?

```

(See Page 37)



## CHARA1FIX—

(Continued from Page 36)

0720	JLE F4A	No	0749		
0721			0750	CNTLW LI R0,576	
0722	MOV @HIGHCH,R3	Yes, start over with highest allowable character	0751	LI R1,MSG7	
0723			0752	LI R2,32	
0724	F4A MOV R3,@CURCHR	Store new value	0753	BLWP @VMBW	'Ready to write...'
0725	JMP F6A		0754		
0726			0755	AI R0,32	
0727	* FCTN-9 pressed, switch to grid mode		0756	A R2,R1	
0728			0757	LI R2,27	
0729	F9 CLR @MODE	Clear flag	0758	BLWP @VMBW	' Press <ENTER>...'
0730	B @MAINX	Start over	0759		
0731			0760	AI R0,32	
0732	* CNTL-R pressed from either mode; restore original character pattern.		0761	A R2,R1	
0733	* Multiply the character number by 8 to obtain an offset, then add		0762	INC R2	
0734	* >2000 so that R0 points to the location in VDP where the original		0763	BLWP @VMBW	'or any other key...'
0735	* pattern is stored from the loaded CHARA1 file. Add >E000 to R1.		0764		
0736	* so that it points to the CPU RAM storage location for this same		0765	LI R0,599	
0737	* character's pattern.		0766	MOVB @DRIVE,R1	
0738			0767	BLWP @VSBW	Display drive number in message
0739	CNTLR MOV @CURCHR,R0		0768		
0740	MPY @EIGHT,R0		0769	CLR @>83C4	Kill ISR hook to avoid anything blinking
0741	MOV R1,R0		0770		
0742	AI R0,>2000		0771	BL @KK	Wait for a keypress
0743	AI R1,>E000		0772		
0744	LI R2,8		0773	CB @>8375,@CODES+1	<ENTER> ?
0745	BLWP @VMBR	Read 8-byte pattern	0774	JEQ CNTLW1	Yes, continue
0746	B @TRY	Start over with a fresh screen	0775	B @TRY	No, start over with a fresh screen
0747			0776		
0748	* CNTL-W pressed from either mode; write CHARA1 back to disk.		0777	CNTLW1 LI R0,>3500	Send output PAB to VDP (See Page 38)

**HARRISON**  
MUSIC  
GAMES  
**SOFTWARE**

**NEW PRODUCT:**  
**WORD PROCESSOR**  
**RUNS IN EXTENDED BASIC**  
**AVAILABLE IMMEDIATELY FROM STOCK**  
**ALL ASSEMBLY LANGUAGE PROGRAM**

FEATURES INCLUDE: MOVE,COPY UP TO FULL PAGE, EVEN INTO ANOTHER DOCUMENT  
FULL COMPATILBILITY WITH EPSON FX/MX, STAR DELTA/GEMINI AND OTHER DOT MATRIX  
ALSO COMPATIBLE WITH QUME AND DIABLO TYPES OF DAISY WHEEL PRINTERS  
BUILT-IN UTILITIES TO CREATE/EDIT PRINTER ACTION TABLES FOR OTHER PRINTERS  
BUILT-IN UTILITIES FOR FILE CONVERSION TO/FROM TI-WRITER OR ASCII FILES  
CONFIGURATION UTILITY TO BOOT-UP TAILORED FOR YOUR SYSTEM AND TASTES  
MENU-DRIVEN, USER FRIENDLY SO ANYONE CAN USE IT ALMOST IMMEDIATELY .

COMPLETE WITH EASY-READING 48 PAGE MANUAL  
MANUAL IS ON SS/SD FLIPPY W/XB PRINT PROGRAM

**PRICED AT ONLY \$20.00**

TO ORDER, OR REQUEST INFO  
PLEASE WRITE TO US AT:  
5705 40TH PLACE  
HYATTSVILLE MD 20781  
OR CALL 301-277-3467

## CHARA1FIX—

(Continued from Page 37)

```

0778      LI R1,CPAB2
0779      LI R2,21
0780      BLWP @VMBW
0781
0782      LI R0,>3500+13
0783      MOVB @DRIVE,R1
0784      BLWP @VSBW      Insert drive number
0785
0786      LI R0,>2000
0787      LI R1,>E000
0788      LI R2,>1000
0789      BLWP @VMBW      Write altered character patterns back to VDP
0790
0791 * The PAB needs to know the number of bytes from VDP it should write to
0792 * the file. Since CHARA1 files vary in length, we must calculate this on
0793 * the basis of the number of sectors the file originally contained.
0794 * This information will be stored in the header and the PAB.
0795
0796      MOV @TOTSEC,R3
0797      MPY @X256,R3
0798      LI R0,>1FFC
0799      LI R1,REGS+8      This is R4
0800      LI R2,2
0801      BLWP @VMBW
0802
0803      LI R0,>3500+6
0804      BLWP @VMBW      Place the bytes in the PAB
0805
0806      LI R3,>3509
0807      MOV R3,@08356      Point to the length byte in the PAB
0808      BLWP @DSRLNK      Write the data out to disk as CHARA1
0809      DATA 8
0810
0811      JEQ BOTCH
0812      B @START      If no error, start program over
0813
0814 * Disk error
0815
0816 BOTCH LI R0,576      Clear part of screen
0817      LI R1,>2000
0818 BOTCH1 BLWP @VSBW
0819      INC R0
0820      CI R0,704
0821      JNE BOTCH1
0822
0823      LI R0,587
0824      LI R1,MSG6      'I/O error...'
0825      LI R2,10
0826      BLWP @VMBW
0827
0828      LI R0,617
0829      LI R1,MSG4      'Press any key...'
0830      LI R2,15
0831      BLWP @VMBW
0832
0833      BL @KK      Wait for key
0834 BOTCHX B @TRY      Start over without losing data
0835
0836 * HELP screen routine
0837
0838 HELP DATA >8300,HELP1 Vector; use scratchpad for workspace
0839 HELP1 LI R0,>0205
0840      BLWP @VWTR      Change screen image table to >1400
0841      BL @CSS      Clear this new screen
0842
0843      LI R4,4      Loop counter
0844      LI R1,HMSG1      Point to first page of messages
0845
0846 HELP1A BL @SETT      Set VDP address to top left corner of screen
0847      LI R0,>20*32      Total of 640 bytes to send to screen
0848 HELP2 MOVB *R1+,@>8C00 Send a byte
0849      DEC R0      Done ?
0850      JNE HELP2
0851
0852      BL @KK      Wait for a key
0853      DEC R4      Decrement loop counter
0854      JNE HELP1A      Done ?
0855      LI R0,>0200      Yes, restore screen image table to >0000
0856      BLWP @VWTR
0857      RTWP      Go home
0858
0859 * SETT sets the VDP write address to >1400. The first two bits
0860 * must be set to 01, which yields an address of >5400.
0861
0862 SETT LI R0,>0054
0863      MOVB R0,@>8C02
0864      SWPB R0
0865      MOVB R0,@>8C02
0866      RT
0867
0868 * Clear screen at VDP >1400.
0869
0870 CSS LI R0,>0054      VDP address with first bits adjusted,
bytes reversed
0871      MOVB R0,@>8C02      Set address
0872      SWPB R0
0873      MOVB R0,@>8C02
0874      LI R0,768      Do this 768 times
0875 CSS1 MOVB @SET,@>8C00 Send a space to the screen
0876      DEC R0
0877      JNE CSS1      Done ?
0878      RT      Go home
0879
0880 * Clear screen at >0000
0881
0882 CS LI R0,>0040
0883      MOVB R0,*R13      Since this routine is called only from
0884      SWPB R0      the normal workspace, we can use the
0885      MOVB R0,*R13      addresses in R13 and R14
0886      LI R0,768
0887 CS1 MOVB @SET,*R14
0888      DEC R0
0889      JNE CS1
0890      RT
0891
0892 * Scan keyboard
0893
0894 KK BLWP @KSCAN
0895      MOV @0837C,R3      Fetch GPL status
0896      LIM1 2      Let interrupts in briefly
0897      LIM1 0
0898      COC @SET,R3      Key pressed ?
0899      JNE KK      No
0900      CB @08375,@SPLIT CNTL-= ?
0901      JEQ QUIT      Yes
0902      RT      No
0903
0904 * QUIT Key (CNTL-=) for Geneve users who don't like CNTL-SHIFT-SHIFT

```

The final installment of this program will appear next month.— Ed



## Page Pro 99

# Easy way to integrate text, graphics

By HARRY BRASHEAR

In the world of TI graphics, we all have a different idea of what the perfect page maker WILL be.

Quite a few darn good entries have come into this race in the past few years. Font-Writer, CSGD, Jiffy Flyer, Form Shop, Picasso and Printers Apprentice, just to name a few, have wowed us every time. Each piece, in it's own right, has been fabulous, but...

There is almost always a "but," or an "if" in the bottom line. No single item is ever going to please everyone, or give the user all of what he is going to need forever.

Fortunately for us, the software keeps coming, getting better, more inventive, and easier to use all of the time. So, ladies and gentlemen, may I present this year's winner in the "Easiest to use—one shot page maker" category, Page Pro 99.

First, take a look at the sample page I made up for this review. Yeah, I know, it's a nightmare, a hodgepodge of pictures, text, and bad humor, but it gives you a good idea of what can be done with this program. There are few restrictions to format, (obviously) and you can make it look as pro as you want.

First, let's take a look at the major features of Page Pro.

- It allows you to design one complete 8½ x 11 page in one shot and save or print it out.
- It has full screen editing. This includes most of the editing features of TI-Writer, in the familiar key presses.
- It allows border making in all of the IBM ANSI graphic characters.
- You may add up to 28 pictures of any size anywhere you like on the page. The pictures are converted from any TI-Artist instances you may have, or wish to create.
- Two font sizes, one for text, one for titles, may be selected from various styles. Both sizes have full editing features.

OK, that should have grabbed you, now let's look at the amazing details.

Page Pro will allow you to make up the entire 8½ x 11 page in just one setting by giving you the ability to page up, down and sideways, showing you 12 lines by 30 col-

## Review

### Report Card

Performance .....	A+
Ease of Use .....	A+
Documentation .....	B+
Value .....	A
Final Grade .....	A

**Cost:** \$24.95 plus \$1.50 postage  
**Manufacturer:** Asgard Software, P.O. Box 10306, Rockville, MD 20850  
**Requirements:** memory expansion, disk system, printer, 99/4A or Geneve

umns at a time. Your final format size is 66 lines by 60 columns. The full page format is tight. If you want to use the full 66 lines, you *have* to start your printer just a hair off the perf. The side borders are only about 3/8-inch, so centering or proper page alignment is a must.

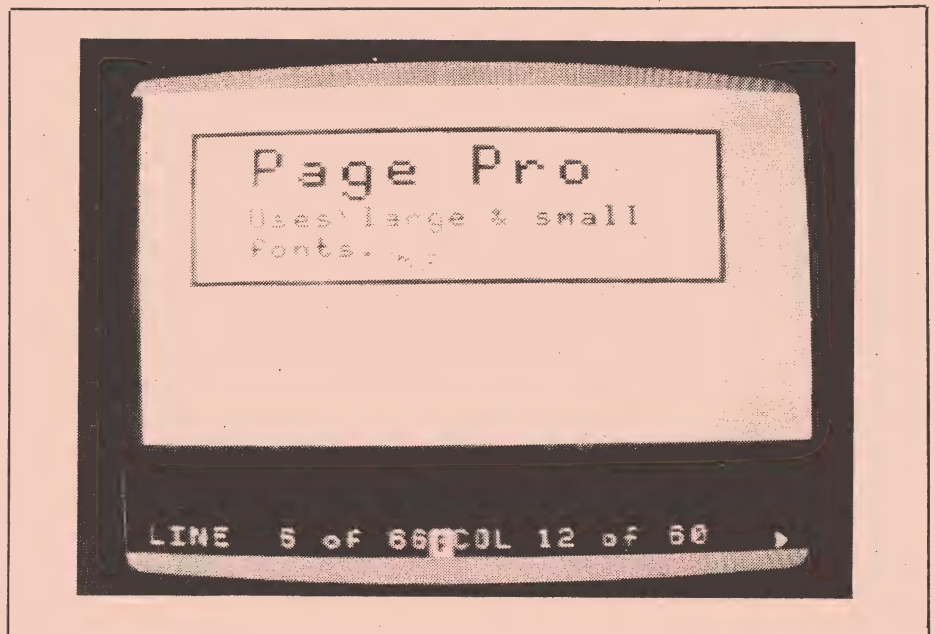
Using Page Pro as a text editor is, for all practical purposes, the same as using one of the Writers. Cursor movement is handled with the FCTN arrow keys to move around the page. You may delete a character, or line, insert a character or line, page up, down and sideways, all with

exactly the same keys as the Writers use. All the editing functions work when you are using regular text size, but a few line editing limitations exist in double size, along with a minor slowdown in cursor speed. It's not bad, but you will miss a letter if you don't cut your typing speed by about half. No big deal!

The cursor will wrap to the next line, as any word processor, but you do not have word wrap. I didn't mind this so much because it gave me a chance to hyphenate. Also, if you want to hand justify for the right column, this is easy to do also. Speaking of justification, if you want to, you can prepare your text file outside the Page Pro environment with any of the Writers, and then just import the text to the Page Pro screen. Likewise, you can save the text from Page Pro to a DV/80 file for Writer use.

One of the more interesting edit functions is the ability to type in any direction. By using CTRL arrow keys, you change the path of the cursor to the arrowed direction. This is cute for various special word effects, but it also has a practical side. When you are using the border function, you can use this method to run lines down, across and up the other side, efficiently.

(See Page 40)



## PAGE PRO 99—

(Continued from Page 39)

By pressing CTRL "8" you are put into "LINE mode." I prefer to call this function "BORDER mode" because that's its main use. Thirty characters represent IBM graphic characters. (But you don't need that mode on your printer to use them in the output.) They can be used as underscores, boxing in the pictures, or even putting a border around the entire page. All the editing functions apply to this phase, just as they do in text mode. When in use, there is a cheat sheet that appears in the bottom half of the screen to assist in the proper key presses.

The crowning glory of Page Pro is its ability to use pictures anywhere on the page, up to 28 of them. These pictures are conversions from the TI-Artist instance format to one better used by Page Pro. "Oh no," you say, "another graphic format?" Yes, but there is a darn good reason for it. First of all they wanted a compressed format that would load quickly, and secondly, one that would take less file space. For comparison, a full page in Picasso, (two Picasso files) requires 170 sectors, a Page Pro full page file needs 21 sectors. *Quite* a difference! To help you, an Extended BASIC program is included with Page Pro to convert Instances to the proper format. It's slow working, but you only have to do it once anyway.

For the lazy among you, or for those that don't use Artist, Asgard is selling seven disks of pictures already converted to get you going. Because of the compressed format, quite a few pictures are on each disk. Actually, they work out to be a better value, per picture, than their old Artist companions.

To load a picture to the page, you just



THE BOX ABOVE WAS CREATED BY LOADING THE PICTURE OF "CHIP" THEN TYPING THE TITLE USING THE "301-LG" FONT FROM ONE OF THE FONT DISKS. FINALLY I TYPED THE BORDER AROUND IT. TOTAL TIME WAS ONLY MINUTES.

THIS PICTURE WAS ADDED TO SHOW DETAIL IN PAGEPRO PRINTOUTS.



UTILITIES ARE BEING MADE NOW THAT WILL MAKE PAGEPRO EVEN MORE VALUABLE!

1. PLACE UP TO 28 PICTURES OF YOUR CHOICE ON ANY PAGE!
2. LARGE OR SMALL FONTS MAY BE CONVERTED FROM ARTIST FONTS
3. PRODUCES A FULL EIGHT AND A HALF BY ELEVEN PAGE IN ANY OF THREE DENSITIES!
4. SUPER VERSATILITY WITH MORE UTILITIES TO COME!
5. ALLOWS YOU TO TYPE IN ANY

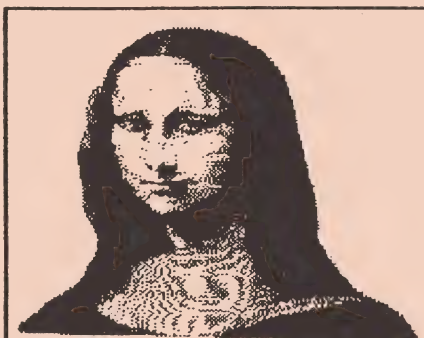
D I R E C T I O N !

Are You Feeling a Little Ill- Tempered about Your Current Page Maker??



TRY PAGEPRO!

## THIS IS A PAGEPRO PAGE



PLAYMATE OF THE MONTH  
JANUARY 1508

THIS  
MAY  
SEE  
N

ASGARD

DELIVERS NOW!

A DUMB, BUT YOU WOULD BE AMAZED

AT HOW MANY

THINGS

This page is far too busy and grossly over-worked, but it gives you a good idea of the possibilities that you have with the PAGEPRO system. If I had known what I wanted here to start with, I doubt that the whole page would have taken more than 1 hour.



YOU AIN'T SEEN NOTHIN' YET!

.....NOITCERID REKTB ENGS NI ETIRW GT DEEN UOY S

Full page printout of Page Pro 99 reduced to 67% of original size

place the cursor at the top left corner of where you want the picture to be. Press CTRL "L" and type in the device and picture name. The picture is loaded in an "as is" mode, in other words, you see the picture just as it is, and will be, in the final printout. However, once you are satisfied with its placement etc., you should press CTRL O and turn it off. The "turning off"

process simply changes the turned on pictures to inverse P's. This is done so that the speed of editing can be maintained. If you have to leave the picture on and move past the visible screen area, the program has to reload part of the picture. This then becomes a slow process in moving around. The whole concept is really pretty well

(See Page 41)



## PAGE PRO 99—

(Continued from Page 40)

thought out.

The pictures are *not* kept in the page file. The program simply notes the name of the picture and what disk drive it came from in the file, along with the text. When you want to reload the page it goes back to the respective drive or drives for the pictures. I couldn't resist using my Horizons for this process just once. Boy, did that stuff load quick! The only problem is that if you forget to put the given picture in the right drive, you get an I/O error. My best advice is to get organized right away with this program. Put everything you need to do a page in one drive, and don't be chasing from one to the other. You'll learn that lesson the hard way, I'm sure.

The program will access up to 28 picture files, so you should never be at a loss for placing graphics on a page. You can also erase any given picture with CTRL K if you misplace it.

### USING THE FONTS

The defaulted large and small fonts are nice, but a little blocky. You have the ability to convert other Artist fonts over to PP format, again, with a conversion program included. A small PP font is eight pixels wide by 12 pixels high. A large one is 24 high by 16 wide, so you should have an idea of what you're dealing with before you start converting. Conversion is easy, a little slow again, but well worth the time spent. I have done this to a few of my Artist fonts and found it quite painless. I repeat, you only have to do it once.

Since many of you may be a little short on Artist stuff, don't worry. Paul Scheidemantle, one of our best graphic

designers, has been commissioned by Asgard to produce about 50 custom fonts for this program. By the time you read this, they should be available.

Once your page is all set, you press CTRL P to send it to your printer. You have the option of single, double and quad densities, so you can do a quick dump, or a nice copy for duplication purposes. The printout is fast enough even though the system is accessing all of those picture files. I found the line feeds perfectly acceptable too. This is important to keep from getting those dumb little white skip lines in solid black areas. If you just want a quick dump to see how things line up, then you can keep the pictures turned off during printing. You can still see some dots in the text printing, but it's not bad. A camera-ready print function, similar to Bob Coffey's famous Instance printer, is promised for one of the forthcoming utility disks.

A columnizer utility is included with the program that will set up two-column pages of text for you. The nice part of this one is that it sets up your TI-Writer files in consecutive page files. In other words, if you have a lot of text, it sets it up as PAGE01, PAGE02, PAGE03, etc. Each file will be one Page Pro page, and can be loaded into the program with CTRL F". If you expect to use pictures, though, you will have to leave room for them in the text. It's a nice little program, and comes in handy for newsletters. It doesn't care what your format is, from 25 to 80 columns, it sets it up in two 28-column rows as neat as a pin. It will justify and page number, (top or bot-

tom of page) optionally.

The documentation included with the program is good. It consists of two manuals, one to get you started, and another for the utilities and advanced techniques, 35 pages in all. They are well laid out, and both the TI beginner and the TI hacker will benefit from reading them. In all fairness though, a file called QUICK-REF that can be loaded into the program and printed out, tells as much as you need to know to get started. The program itself is on one disk, but a second disk is included that's loaded with test files and examples to work with.

Two versions of the program are included, one for the 4A and another one specifically for the 9640. I am told that there are no real differences, though. It mainly had to do with the VDP I guess, so they had to do it twice. Nuff said that nobody gets left out of this one. All in all, it's a nice program with a lot of potential. The price is right at \$24.95 and I have already used it on a couple of our newsletters with good results. Ed Johnson, the author of Page Pro, is an excellent assembly programmer and he has a lot of good ideas for future PP utilities. It works well, I couldn't find any nasty bugs, and it does exactly what it says it will. Who could ask for more? I haven't seen potential like this for a long time and it's geared to the end user... about as friendly and easy as they come. All you have to do is read the docs and you can produce. If you are looking for a publishing system, dive in now. There's a lot more to come, I think, and it's not a program to be afraid of.

## Starlink system provides BBS calling

A new system on the Tymnet service, StarLink, is a service which provides linkups via modem to long distance bulletin boards, bypassing long distance charges, similar to Telenet's PC Pursuit.

Information and online signups are available via modem at 1-800-343-3704.

The signup information also contains information on the Galaxy Information Network BBS.

More than 130 United States cities can be reached through StarLink's outdial service and StarLink has more than 1,000 local access numbers available in the United States and Canada.

Fees include \$25 registration, a monthly \$10 service fee, and \$1.50 per hour in the "lower 48" continental United States during non-prime time hours (7 a.m.-6 a.m. Monday through Friday, all day Saturday, Sunday and major holidays).

Membership entitles the user to two free hours on the Galaxy Information Network (StarLink connect charges still accrue).

Persons dialing the information number are required to type in name, street address and home telephone number before the service provides further information.

# Newsbytes

## Disk Only Software gets new 800 number

Disk Only Software has installed a new toll-free 800 number to handle credit card orders 24 hours a day, seven days a week, according to Jeff Guide of the company.

Disk Only Software accepts Visa, MasterCard and American Express, Guide says.

The number, 1-800-736-4951, currently operates in the continental United States. Guide says the company plans to add toll free 800 number phone service from Canada in the near future. Orders from Canada and overseas may be placed by calling (703) 550-9877, he says.

Guide says the company plans to phase out its previous toll free 800 number because of an increase in phone charges.

He says Disk Only Software has added a direct order line for ordering or checking availability of Myarc computer products at (301) 340-7179, 9 a.m.-5 p.m. EDT.

The company also deals in Genial Computerware, Asgard Software and Horizon RAM Disks.

Address for Disk Only Software is P.O. Box 244, Lorton, VA 22079.

## Disk index offer no longer available

Norberto Bettinelli of Buenos Aires, Argentina, is no longer able to provide the MICROpendium index on disk he previously offered.

His son, Leandro Bettinelli, advises that his father has been bedridden for the last two months and is expected to remain so for several more.

## WINDYXB offered

Richard Lynn Gilbertson is offering an extension to Extended BASIC for the TI accessed through CALL LINK statements in XBASIC, called WINDYXB.

The program may be downloaded from the PUNN (Portland Users of 99s) BBS at (503) 233-6804. Gilbertson is offering the program as fairware, and asks that it be distributed by users' groups only.

Extensions include:

1. CALL LINK("HPUT",ROW,COL,S

TRING)

This link duplicates the DISPLAY AT in Extended BASIC, but uses columns 1 to 32 and rows 1 to 24 for horizontal displays.

2. CALL LINK("VPUT",ROW,COL,S TRING)

This link duplicates the DISPLAY AT in Extended BASIC, but uses columns 1 to 32 and rows 1 to 24 for vertical displays.

3. CALL LINK("HGET",ROW,COL,LENGTH,STRING)

This link retrieves a string from the screen horizontally as specified in LENGTH.

4. CALL LINK("VGET",ROW,COL,LENGTH,STRING)

5. CALL LINK("WINDOW",WINDOW#(1-6),NUMBER)

This link either stores or loads the entire screen to or from memory. (Sprites and colors are not saved.)

6. CALL LINK("WINDY",ROW#(1-21),NUMBER)

This link either stores or loads the entire screen to or from memory. (Sprites and colors are not saved.) (6 window \* 24=121 rows.)

7. CALL LINK("SDUMP","DSK#.file name")

This link stores to disk everything on screen: sprites definitions, colors speed, location of sprites and patterns, colors, positions of screen (except screen background color).

8. CALL LINK("LDUMP","DSK#.file name")

This link loads to screen and memory what was dumped with SDUMP and 1.8 seconds later the screen is initialized fully. The sprites are moving and all colors (except screen background color).

9. CALL LINK("DUMP",TAB#)

This link dumps to printer as a standard screen dump utility, with the tab number indicating tab position on paper (PIO Epson compatible only).

Gilbertson says he has created a 100 percent compatible program with RAM disks using a standard DSR link tested on Myarc and CorComp RAM disks. He says XBASIC programs can be rewritten using WINDYXB to take the place of numerous items. He says he has "knocked off as much as 5K from an original 12K game program, plus received the added bonus of the program running considerably faster."

For further information, contact Gilbertson at 2205 S.E. Salmon, Portland OR 97214.

## Software released

DDI Software has released Appointment Scheduler for the Geneve 9640 and a utility package called Artist Utility.

Appointment Scheduler requires MDOS 95H and Advanced BASIC 6/29 or later versions.

The program is designed to create an appointment schedule on a day-to-day basis for every month of the year. According to the manufacturer, it uses many of the new commands available, such as TCOLOR, redefinitions of command line, CALL MARGINS and CALL CHAR above ASCII 143.

Artist Utility includes Slidemaker, a program to create slides and instances for TI-Artist; Prografix, a program to create graphics for use in a program in HEX or ASCII; and Textgrafix, a program to create small graphics for My-Word and TI-Writer. It uses no TLs and runs out of Extended BASIC.

Appointment Scheduler sells for \$15 and Artist Utility for \$12. For further information or to order, contact DDI Software, 2004B Leann, Austin, TX 78758.

## Videotapes available to users groups

Videotapes of all seminars at the May 20 Lima Ohio Multi User Group conference are available to any user group for the cost of media and postage, according to Charles Good, librarian for the group.

The tapes are not available to individuals, except paid members of the Lima User Group.

The tapes contain almost 11 hours of material, including presentations by Barry Traver, Chris Bobbitt, Bud Mills, Jim Horn and Paul Scheidemantle.

Also shown are demonstrations of SUPERBASIC v2, MX-DOS v3.0 and some features of an as-yet-unreleased major revision of Funnelweb designed specifically for 80-column systems.

User groups can obtain copies of these (See Page 43)



# Newsbytes

(Continued from Page 42)

tapes by sending two VHS videotapes and a paid return mailer, or \$10, to the Lima Ohio User Group, P.O. Box 647, Venedocia OH 45894. Those groups in the U.S. sending money will receive their videotapes via fourth class mail, Good says.

## More on TI-Tref

The Fourth Annual TI-Tref is scheduled for Oct. 7 in the Het Kolpinghuis, located within five minutes walking distance from the railway station in Nijmegen, The Netherlands. The three previous events were held in Germany.

According to Drs. E.C. van Wette, secretary of the TI-Gebruikersgroep, the Dutch users group, 40 European users groups have been invited to the meeting.

Presentations planned include one by a Myarc representative, van Wette says. Items will be available for sale, an auction will be held and door prizes will be awarded.

For further information, contact Vereniging TI-Gebruikersgroep, Secretariaat: Drs. E.C. van Wette, Kremersmaten 106, 7511 LC Enschede, The Netherlands.

## Texaments releases new products

Texaments has released TI Sort and four

new companion products for TI Artist.

TI Sort is described as the only universal sort utility available for the TI99/4A.

Steve Lamberti, president of Texaments, says TI Sort is a standalone, fully menu-driven program capable of sorting an unlimited amount of records stored in almost any type of file, including TI Base files, delimited files, fixed length files and BASIC or Extended BASIC files. Files to be sorted may be located on any type of device, including floppy disk, RAMdisk and hard disk, he says.

TI Sort is described as being based on the "Quick Sort" method originally developed by C.A.R. Hoare, and as occupying a minimum amount of system memory. It will sort on up to eight fields and sorts large blocks of data in a dual pass process, according to the manufacturer.

In time trials, Lamberti says, a standard TI Base files with 843 records sorted on two fields was completed in 8 minutes, 59 seconds using a standard floppy drive. The same sort was completed in three hours, 47 minutes and 26 seconds using the SORT directive of TI Base. A standard delimited 999-sector file with 2990 records sorted on one file was completed in 13 minutes, 49 seconds using a hard disk drive.

Operating requirements for TI Sort include a disk system, 32K memory expansion and either Extended BASIC, Editor/Assembler or Mini-Memory. The utility is compatible with all storage devices and the Geneve 9640 in GPL mode. Cost is

\$14.95.

The Artist's Companion disks 10-13 have added predefined scenes to the series, designed for users to create pictures and backdrop or to accent existing drawings. Scenes consist of small "building blocks" which may be arranged in any manner on a horizontal plane. Scenes include fences, mountains, skylines and beaches, Lamberti says.

Also new to the series are predefined borders, including beads, ants, hearts and ribbons.

The two-disk sets also each contain an assortment of fonts and small and large instances.

Artist's Companion #10 contains six fonts, 13 large instances, seven small instances, nine borders and five scenes; #11 contains six fonts, 13 large instances, seven small instances, 10 borders and five scenes; #12 contains six fonts, nine large instances, 10 small instances, 14 borders and four scenes; and #13 contains three fonts, eight large instances, 11 small instances, 25 borders and three scenes.

The new Artist's Companion sets are available for \$9.95 each, any two for \$17.90 any three for \$26 or all four for \$34.

A \$2.50 shipping charge applies to all orders.

For information or to order, contact Texaments, 53 Center St., Patchogue, NY 11772 or (516) 475-3480.

## User Supported Software

### ZODIAC WHEEL OF FORTUNE, NIGHT SNIPER

These two programs require X BASIC, disk system and memory expansion. Zodiac is a fortune-telling program that displays zodiac signs based on dates, forecasts lucky periods and makes note of important events. The cost is \$5.

The object of Night Sniper is to fight invading aliens under cover of darkness. Your weapon is a night-penetrating gun scope. The author is John Bulakowski. The cost is \$4.

Send disk and postage-paid return mailer to Janet Ryan, 10 Jolly Rd., Ellington, CT 06029. Proceeds are to be donated to the Nutmeg TI-99ers.

### JAPANESE

Japanese is a diskful of programs designed to help the student of the language, but can also be useful to show off the TI at its best. An X BASIC loader will walk you through the whole disk. Six pages of documentation are included on a D/V80 file. Pro-

grams cover all three forms of written Japanese, as well as five printer programs that make study sheets in Romanized Japanese. One of the programs requires memory expansion, the remainder run on a console and disk drive. Cash donations are accepted after delivery. Send disk, self-address, postage-paid return mailer to Don Shorrock, Box 501, Great Bend, KS 67530.

*User Supported Software* is non-commercial software written and distributed by readers. Anyone wishing to submit an announcement is encouraged to send a copy of the program as well as a description to MICROpendium, P.O. Box 1343, Round Rock, TX 78680. MICROpendium cannot take responsibility for any announcement that appears in this column. Readers who encounter as a result of placing orders are asked to contact us by mail. An inclusive listing of *User Supported Software*, consisting of 10 pages, is available from MICROpendium for \$2.

# User Notes

## AUTOEXEC and menu for hard disk drive

This comes from Jim Uzzell of Austin, Texas. He writes:

Because the hard disk version of MDOS has not been finished, I took the (KISS) approach to set up my hard drive.

To have AUTOEXEC auto-boot, you must use a sector editor to change (DSK1) AUTOEXEC in sectors 00EE and 00EF of MDOS V1.14 to hdS1. Make this change to a copy of MDOS, of course, and not the original.

You will notice in the following AUTOEXEC file that I have assigned F=WDS1. This allows you to have modules to load to their option menus (see coding for file E—TI X BASIC).

### AUTOEXEC FILE

```
AUTOEXEC
ECHO ON
ASSIGN E=hdS1:
ASSIGN F=WDS1:
E:
TYPE E:MENU
```

### MENU FILE

```
MAIN MENU
&A....MYWORD
&B....TELCO
&C....EA
&D....ADVBASIC
&E....TI X BASIC
&F....MULTIPLAN
&G....UTILITIES
&H....GPL
ENTER (&) and LETTER
```

Here are paths used on some files:

### File A. MY-Word

```
TIMODE
E:GPL.GPL F:DSK1.MW
DSK1 is a subdirectory.
```

### File E. TI-XBASIC

```
TIMODE
ASSIGN C=DSK5:
RAMDISK 120
E:GPL.GPL F:XB.EXB
```

### File F. MULTIPLAN

```
TIMODE
E:GPL.GPL F:DSK.TIMP.MP
```

### File H. GPL

This file is set up so that I can load modules that I don't have on the hard drive.

All the above files (A-H and Menu) and AUTOEXEC are located in the root directory.

The reason I have chosen this approach is that the current version of MDM5 formats the hard drive as WDS1 and as the development of the Geneve has gone, I probably will have to reformat my hard drive when the final version of the hard disk version of MDOS and disk manager are released.

## NX-1000 modification for Disk Label II

This comes from Rodney Wright of Musquodoboit Harbor, Nova Scotia. He writes:

Once again Ed Machonis has written a very useful utility that he has shared with us (Disk Label II, February 1989, Page 34).

However, owners of the Star NX-1000 multifont printer may have a slight problem with the program if they try to print more than one label at a time. The name header does not print out in expanded form the second time around. The "fix" is quite simple.

List the program and fine line No. 6. Now go into edit mode and immediately after the first colon (the one after PRINT #1), type in E\$&"@";.

Here is what the line should look like:

```
6 PRINT #1:E$&"@";E$&"E";E$&"G";E$&"-1";E$&"W1";TAB((18-LEN(D$))/2);D$;TAB(18);"";TAB((18-LEN(C$))/2);C$;TAB(18);"";E$&"F";CHR$(15);TAB(2);T$;
```

What you have done is to reset the printer codes for each repetition of your label.

## Routine performs modulo division

This comes from Bob Keahey of Albuquerque, New Mexico. He writes:

This subprogram performs modulo division, which is integer division which returns the remainder. I wrote it because I was converting an Microsoft BASIC program to my TI and needed to use modulo division.

```
1 ! LINES 10-50 NOT PART OF
SUB !088
2 ! MSBASIC COMMAND Z=X MOD
Y !076
10 CALL CLEAR !209
20 INPUT X,Y !246
25 DVD=X :: DVSR=Y !204
30 CALL MOD(DVD,DVSR,RMD)!027
40 Z=RMD !251
45 PRINT Z !246
50 GOTO 20 !099
10000 SUB MOD(DVD,DVSR,RMD)!031
10001 !MODULO DIVISION !216
10010 !BY BOB KEAHEY !232
10020 !DVD IS DIVIDEND !132
10030 !DVSR IS DIVISOR !190
10040 !RMD IS REMAINDER !217
10060 TDD=INT(DVD):: TDR=INT(DVSR)!089
10070 TD1=DVD-TDD :: TD2=DVSR-TDR !248
10079 !THE NEXT TWO LINES DETERMINE THE ACCURACY OF THE ROUNDING PROCESS !028
10080 IF TD1>.49999999 THEN TDD=TDD+1 !176
10090 IF TD2>.49999999 THEN TDR=TDR+1 !205
10100 DVD=TDD :: DVSR=TDR !225
10110 ZT=DVD/DVSR !077
10120 IF ZT<1 THEN RMD=DVD : GOTO 10170 !204
10130 RMD=DVD !127
10140 FOR L=1 TO INT(ZT)!043
10150 RMD=RMD-DVSR !133
10160 NEXT L !226
10170 SUBEND !168
```

## Fix for Archiver 3 to work with Geneve

Barry Boone, author of Archiver, says the following change to the Archiver 3 will make it compatible with the Geneve. Versions of the program dated April 12 or earlier require the change.

Using a sector editor, locate the following string: 04E08C00.

Replace it with: D8018C00.

(See Page 45)



# User Notes

## Program lets synthesizer read TI-Writer files

This comes from Walter Chmara of Bensalem, Pennsylvania. He writes:

The following short program enables the speech synthesizer to verbalize TI-Writer files. The only glitch in it that I have found is that the Terminal Emulator II module has a problem reading quotation marks. Use the Replace String function to change any quotation marks in the file to a @ symbol before saving it to disk. The program will then have no problem reading it from the disk.

Also, you can add pitch and slope numbers and inflection symbols via TI-Writer into the same file for dramatic effects. You may even misspell some words for a particular pronunciation or to imitate foreign accents. Of course, once you've gone that far, you'll probably want to give it a different SAVE name from the file you for outputting to a printer. And if you intend to create a diskfull of bedtime stories to put yourself to sleep at night, this program can be easily modified to read additional files in sequence.

```
100 REM **TI-READER**      *by
W. Chmara* !127
110 REM Requires Speech Synthesizer, TELL, TI-Writer file on disk to read. !201
120 REM Make sure all quotation marks (") in the file have been changed to @ (the "at" symbol). !215
130 CALL CLEAR !209
140 CALL CHAR(64,"00282828") !072
150 OPEN #1:"SPEECH",OUTPUT !122
160 OPEN #2:"DSK1.EXAMPLE",DISPLAY,INPUT,VARIABLE 80 !222
170 IF EOF(2) THEN 320 !112
180 INPUT #2:X$,!110
190 PRINT X$ !024
200 B$="" !235
210 FOR A=1 TO LEN(X$) !244
220 A$=SEG$(X$,A,1) !133
230 Y=ASC(A$) !197
240 IF Y=64 THEN 250 ELSE 26
```

```
0 !145
250 Y=Y-32 !097
260 IF Y>96 THEN 270 ELSE 28
0 !193
270 Y=Y-32 !097
280 B$=B$&CHR$(Y) !222
290 NEXT A !215
300 PRINT #1:B$ !174
310 GOTO 170 !249
320 CLOSE #2 !152
330 PRINT #1:"//50 160" !145
340 PRINT #1:"THIS IS THE ^
END OF THIS FILE" !228
350 CLOSE #1 !151
360 STOP !152
370 REM "DSK1.EXAMPLE" should be changed to whatever filename you want to read. !249
```

## Routine creates instructions for programs

This comes from Jim Peterson of Tiger Cub Software. He writes:

How often have you downloaded a program, and had to figure out for yourself how to run it? So, before you pass it on to someone else, why not add some instructions to it? This little routine makes it easy.

To use the program, type the instructions and format them, centered or hyphenated or right-adjusted, just as you want them to appear on screen, and enter each line. It will be written to a D/V163 file named @DATA. When finished, enter END.

Then enter NEW, then MERGE DSK1.@DATA, and RUN to see if everything is okay. If so, load the program needing instructions, make sure its lowest line number is more than 8 and the highest is less than 30721, and enter MERGE DSK1.@DATA.

This is a program that writes a program, so it must be assembled in parts. First key in this part and save it as SHELL.

```
100 CALL CLEAR :: OPEN #1:"DSK1.@DATA",VARIABLE 163,OUTPUT :: DEF L$(X)=CHR$(120)&CHR$(X) !177
110 L=L+1 :: X=X+1 :: ACCEPT AT(L,0):M$ :: IF L=24 THEN CALL CLEAR :: L=0 !163
```

```
120 IF M$<>"END" THEN PRINT #1:L$(X)&CHR$(147)&CHR$(199)&CHR$(LEN(M$))&M$&CHR$(0):: GOTO 110 !023
130 REM !154
140 PRINT #1:CHR$(0)&CHR$(4)&"T@"&CHR$(190)&CHR$(200)&CHR$(LEN(STR$(X-1)))&STR$(X-1)&CHR$(0) !234
150 PRINT #1:CHR$(255)&CHR$(255):: CLOSE #1 !109
```

Next, key in this part and save it as DSK1.D/MERGE,MERGE.

```
1 DISPLAY AT(12,1)ERASE ALL:"SKIP INSTRUCTIONS? Y" :: ACCEPT AT(12,20)SIZE(-1)VALIDATE("YNyn"):@Q$ :: IF @Q$="Y" OR @Q$="y" THEN 8 !098
2 DISPLAY AT(24,5)ERASE ALL:"PRESS ANY KEY" !226
3 RESTORE 30721 !214
4 REM !154
5 FOR J@=1 TO T@ :: READ @ $ :: DISPLAY AT(J@,1):@ $:" " !254
6 CALL KEY(0,K@,S@):: IF S@=0 THEN 6 !010
7 NEXT J@ !032
8 REM !154
```

Finally, key in this conversion routine.

```
100 OPEN #1:"DSK1.D/MERGE",VARIABLE 163,INPUT :: OPEN #2:"DSK1.D/MERGE2",VARIABLE 163,OUTPUT :: L=129 :: FOR J=1 TO 8 !244
110 LINPUT #1:M$ :: PRINT #2:CHR$(0)&CHR$(L+J)&CHR$(156)&CHR$(253)&CHR$(200)&CHR$(1)&"1"&CHR$(181)&CHR$(199)&CHR$(LEN(M$))&M$&CHR$(0):: NEXT J !214
120 CLOSE #1 :: PRINT #2:CHR$(255)&CHR$(255):: CLOSE #2 !136
```

Run that last one to convert the D/MERGE file to another file called D/MERGE2. Then load the SHELL, enter MERGE DSK1.D/MERGE2, run the program and key in the second and third paragraphs above to make it write itself a screen of instructions.

Readers who don't have time to key this in may send \$3 for a diskfull of this and other utility programs from Peterson at 156

(See Page 46)



# User Notes

(Continued from Page 45)

Collingwood Ave., Whitehall, OH 43213.

## Pascal quirk corrected

This comes from Denver Earl Sullivan of Osgood, Indiana. He writes:

Many TI users have abandoned the UCSD p-System, but it is an excellent programming environment once one overcomes the defect in the SYSTEM.LIBRARY file.

If you put the Compiler in #5, the Editor/Filer in #4, and the storage disk in #9, when using the USING SPEECH library routines, as well as any other library routines, you will receive an "Cannot Access Library Files" error when the program is in the compilation stage of development.

To correct this, copy the following files to each storage diskette that you are using

and place the disk in #4, then the compiler, editor-filer, etc. can reside in any other drive.

Note: This is not necessary for the hard

disk version.

ED-FILR:SYSTEM.SYNTAX

COMPILR:SYSTEM.LIBRARY

## Classified

### SOFTWARE

#### "BOOT PROGRAM"

Copyrighted by the Miami Users Group Feb. 1989. Not available from any other source or Mail Order Co.

Latest up-to-date version by the original author, John Johnson.

"BOOT" is in assembly language and uses the Horizon RAM Disk "MENU" program, without a RAM Disk.

You will be able to:

1. View a file
2. Catalog a disk
3. Run a program, XB, EA, or cartridges.
4. Access any program on any drive
5. Even run XB programs over 42 sectors.
6. Print any file or disk catalog.

Send \$7.95 to:

MIAMI USERS GROUP

YVETTE MCKENZIE

6755 TAMiami CANAL ROAD

MIAMI, FL 33126

v6n6

## 1989 TI FAIRS

### MARCH

**West Coast Computer Fair**, March 17-19, Brooks Hall, San Francisco. San Francisco 99ers to be at Booth 733. For further information, write San Francisco 99ers, 24816 Mango St., Hayward CA 94545.

**TICOFF (TI Computer Owners Fun Faire)**, March 18, Roselle Park High School, Roselle Park, New Jersey. For information, write TICOFF'89 c/o Roselle Park High School, 185 West Webster Ave., Roselle Park, NJ 07204, or call Robert Guellnitz at (201) 241-4550 or (201) 382-5963 or the TICOFF BBS, (201) 241-8902.

### APRIL

**Fourth Annual New England TI Fayuh**, 10 a.m.-5 p.m. April 1, Ramada Inn of IH95 in Woburn, Massachusetts. For information, contact the Boston Computer Society TI99/4A User Group, One Center Plaza, Boston MA 02108.

**Alberta TI-Orphan Reunion**, April 29 at Innisfail Country Lodge, Innisfail, Alberta, Canada. For information, contact Fred Kessler, Box 20, Sundre, Alberta, Canada TOM 1X0 or (403) 638-3916.

**4th Annual Ottawa TI-FEST**, April 29 at Merivale High School in Nepean, Ontario, Canada. For information, contact Jane Laflamme, 5480 Canotek Rd. Unit #10, Gloucester, Ontario, Canada K1J 9H6 or (613) 745-2225.

### MAY

**Multi User Group Conference** May 20, Reed Hall/Student Activities Building, Ohio State University, Lima, Ohio. For further information write Lima Users Group, P.O. Box 647, Venedocia, OH 45894, or call Dave Szippel evenings at (419) 228-7109.

### JUNE

**TI99/4A Users Group (U.K.) Annual Meeting** June 17 in Romley, England. For information, contact Stephen Shaw, 10 Alstone Rd., Stockport, Cheshire, England SK4 5AH.

### SEPTEMBER

**TI International Expo 89** Sept. 16 at Howard Johnson Inn, 5821 Richmond Highway, Alexandria, Virginia. For further information write Mid-Atlantic Ninety-Niners, TI International Expo 89, P.O. Box 4005, Rockville, MD 20850, (301) 340-7179; or Delphi TI-NET, Teledata; or CompuServe, 74405.1207.

**Fourth Annual TI99/4A Seattle Convention**, Sept. 23-24 at Kenmore Flea Market in Kenmore, Washington. For further information contact Barb Wiedershold, (206) 361-0799 (voice) or (206) 361-0895.

### OCTOBER

**Fourth European Tref**, begins at 10 a.m. Oct. 7 at Kolpinghuis, Nijmegen,

The Netherlands. For information, contact Berry Harmsen, 1e, Oosterparstr 141e, 1091 GZ, Amsterdam, Holland.

**Australia TI Fair**, 2-6 p.m. Oct. 14, Pavilion, Deepdene Park, Whitehorse Rd., Deepdene, Australia. For information contact TI99/4A Users Group — Melbourne Inc., 88 Main St., Blackburn, Victoria 3130, Australia.

**3rd International TI-Users Meeting**, 10 a.m.-6 p.m. Oct. 15 at Jugenderherberge Duisberg Wedau, Kalkweg 148, 4100 Duisberg 48, West Germany. For information contact TI-99er Workshop Rheinland, Dept. Allgemein & Software, c/o Mike Heuser, Karl-Marx-Allee 18, 5000 Cologne 71, West Germany, or the organizing committee at PCC, TI-Service, c/o Hans Greiffenberg, Großglocknerstr. 45, D-4100 Duisberg 28., West Germany.

**Third Annual CPUG Computer Expo**, 7 a.m.-2 p.m. Oct. 15 at Carlisle Fairgrounds on Clay Street in Carlisle, Pennsylvania. Sponsored by Central Pennsylvania 99/4A Users Group, co-sponsored by Cumberland County Amateur Radio Service and 6th Annual Cumberland County Hamfest. For information, contact Central Pennsylvania 99/4A Users Group, P.O. Box 14126, Harrisburg, PA 17104-0126 or the WIZ/TIB BBS, (717) 657-4992 or 657-4997.

### NOVEMBER

**Chicago TI-Faire**, 9 a.m.-5 p.m. Nov. 4 at Holiday Inn, 3505 Algonquin Rd., Rolling Meadows, Illinois. Social evening Nov. 3, dinner evening of Nov. 4. Sponsored by Chicago Area TI99/4A Users Group. For information contact Sandy Bartels, Chicago Area TI99/4A Users Group, P.O. Box 578341, Chicago, IL 60657 or (312) 859-3850.

**Milwaukee TI-Faire**, 9 a.m.-5 p.m. Nov. 5 at Quality Inn, 5311 S. Howell Ave., Milwaukee, Wisconsin (across from Mitchell Field Airport). For information call Gene Hitz, 4122 N. Glenway, Milwaukee, WI 53222 or (414) 535-0133.

## 1990 TI FAIRS

### FEBRUARY

**TI-Fest West '90**, Feb. 17-18, Day's Inn, 88 E. Broadway, Tucson, Arizona. Sponsored by Southwest 99ers. For information, call (602) 747-5046 or the Cactus Patch BBS, (602) 795-1953 or check GEnie. For room reservations, call (602) 791-7581 by Jan. 16 and mention Fest-West.

This TI event listing is a permanent feature of MICROpendium. User groups and others planning events for TI/Geneve users may send information for inclusion in this standing column. Events will remain listed throughout the year for reference for the coming year.



# Classified

## SOFTWARE

### FOR SALE

120 original programs \$1 each, 18 full collection disks \$5 each, 5 Tips disks reduced to \$5 each, 3 Nuts & Bolts disks reduced to \$10 each. Send \$1 refundable for Tigercub catalog. 250 disks of public domain and fairware, \$1.50 each. Send SASE for list or \$1 refundable) for catalog, to TI-PD, 156 Collingwood Ave., Whitehall OH 43213. v6n12

### CBM-III

Now in V5.6 — a better mousetrap for your finances. More than 50 menu-driven functions (recording, editing, balancing, reconciling, sorting, searching, analysis, etc.) with 32 help screens from a 4-screen menu. On-disk documentation. Epson printer compatible. Geneve compatible. Specify greatest disk drive configuration. \$15.00 to: W. Irving Crowley, Lost Canyon Rd., Pine Level, AL 36065. Ph (205) 584-7644. v6n6

### APPOINTMENT SCHEDULER

FOR  
GENEVE 9640  
\$15.00

ARTIST UTILITY  
FOR  
XBASIC  
\$12.00

DDI SOFTWARE  
2004B LEEANN  
AUSTIN, TX. 78758 v6n6

## SYSTEMS

### TI99/4A

Speech Synth, PEB, monitor, Panasonic KX-P1091, XB, TI-Writer, Disk Fixer, Disk Manager, SS, drive, 128K, RS232, 17 cartridges, with desk and printer stand, make offer. K. Marinelli, Beverly, MA (508) 927-6928. v6n6

### TI99/4A SYSTEM FOR SALE

TI99/4A, PE-Box, 2 disk drives & controller, RS-232 & cable, 32K card, Extended BASIC, Editor/Assembler, TI-Writer, BRAIN, TI-1-2-3, GRAPHX, C, Pilot, Forth Compilers. Mint condition, \$275 or best offer. Check, Vista, MasterCard. Julian Achim, 8425 68th Way

## Policy

The cost of classified advertising is 25 cents per word. Classified display (i.e., special formatting or graphics) is \$9 per column inch. Classified advertisements must be paid in advance. Classified advertisers may request a category under which they would like their advertisements to appear, but the final placement decision is the responsibility of the publisher.

Classified deadlines will be kept open for as long as practical. For the purpose of classified advertising deadlines, any classified ad received later than the first day of any month cannot be assured of placement in the next edition. We will do our best to include every advertisement that is submitted in the earliest possible edition.

The publisher offers no guarantee that any advertisement will be published in any particular issue. Any damages that result either from errors in copy or for failure to be included in any particular edition will be limited to the amount of the cost of the advertisement itself. The publisher reserves the right to reject any advertisement.

The advertiser may elect to publish the advertisement in subsequent editions at the same charge, payable prior to publication. The deadline for carryover classifieds is the same as for new advertising.

In submitting an ad, please indicate whether you would like a refund if it is not published in the requested edition or whether you would like us to hold it for the next edition. Cancellations and refunds cannot be made after the second day of the month.

Send classified advertising to: MICROpendium, P.O. Box 1343, Round Rock, TX 78680.

## SYSTEMS

North, Pinellas Park, FL 34665. (813) 545-4354. v6n6

## MISCELLANEOUS

### Texas Instruments

#### TI-99/4a

#### Hardware & Software

—TURBO-PASC'99 (Pascal)! \$59.95 E/A required.—  
Proto-Board for PEB by Willforth only \$35. Joy-Sticks \$10.00 XB Detective \$10.00. Rave '99 Keyboard!! \$199.  
Speech Editor \$20. Printer Cable (PIO) \$24. Jungle Hunt, Protector II, Moon Patrol, PacMan \$15 ea. TI Dust Cover \$4, Adventure \$10.00. Adv Hint Book \$8.  
TI Extended BASIC \$40, P-Code Card w/software \$159.  
TI-Artist \$20. Princess & Frog, AntEater, HenPecked \$10 ea.

\*TI-BASE \$25 (great) Data Base, PEB Hardware Manual 32K, Disk Ctrl, RS232, RAMdisk Cards, Cables & Connectors

### L.L. CONNER ENTERPRISE COMPUTER&ELECTRONICS

1521 Ferry Street  
Lafayette, IN 47904

CALL 317-742-8146 or CALL 317-423-4879 to order UPS today!

Visa or M/C Accepted, add \$3 shipping v6n6

### GAMES! EDUCATIONAL! HARDWARE! —TI99/4A

CALL OR WRITE FOR FREE CATALOG:

JOY ELECTRONICS, INC.; P.O. BOX 524526;

DALLAS, TEXAS 75354-2526;

(214) 243-5371, LOCAL; (800) 442-3892, TEXAS;

(800) 527-7438, OUTSIDE TEXAS v6n6

## MISCELLANEOUS

PASCAL COMPLETE SYSTEM	\$150
BARCODE READER	\$ 30
FULL TI PE/BOX	\$350
EMPTY TI PE/BOX	\$135
18" P-BOX EXTENSION CABLE	\$ 25
SCM DOT MATRIX PRINTER	\$110
SPEECH SYNTHESIZER used	\$ 45
PARALLEL PRINTER CABLE 6'	\$ 20
RS232 "Y" CABLE	\$ 15
STAND ALONE DISK DRIVE "TI"	\$ 79
PE-BOX TECH TRAINING MANUAL	\$ 30
TI ORIGINAL COLOR MONITOR	\$175
SERVICE MANUAL (CONSOLE/P BOX)	\$ 25
4A FACTORY REPAIR MANUAL	\$ 30
EXTENDED BASIC used w/new book	\$ 35
PLUS 5% SHIPPING CALL OR WRITE for complete free list	
JIM LESHNER, 722 HUNTLEY	
DALLAS, TEXAS 75214, 214 821 9274 <span style="float: right;">v6,n6</span>	

## ENORMOUS INVENTORY

TI 99/4A. Laser,  
Apple & IBM Compatibles.

"Some Commodore and Atari Items. (No Catalog on Above Two Systems.)" Full Hardware & Software on All Other Systems. Complete Line of Computer Forms.

## BRAATZS

### Computer Services

719 E. Byrd St., Appleton, WI 54911.  
Catalogs \$2. MC/Visa accepted.  
414-731-3478 (ORDER LINE ONLY) (Call 414-731-4320 after 6:00 P.M. Wisconsin time.) Custom made covers (send sizes). v6n6



# The LEADING monthly devoted to the TI99/4A

## Subscription Fees

\$20 for 12 issues via domestic second class mail  
 \$25.25 (U.S. funds) Mexican delivery  
 \$27.50 (U.S. funds) Canadian delivery  
 \$25.00 (U.S. funds) for 12 issues other foreign delivery  
 via surface mail  
 \$37.00 (U.S. funds) for 12 issues other foreign delivery  
 via air mail

Outside U.S., pay via postal or international money order or credit card;  
 personal checks from non-U.S. banks will be returned

## Address Changes

Subscribers who move may have the delivery of their most recent issue(s)  
 delayed unless MICROpendium is notified six weeks in advance of ad-  
 dress changes. Please include your old address as it appears on your  
 mailing label when making an address change.

## Back Issue Policy

Back issues of MICROpendium are available to subscribers only. Those  
 wishing back issues may notify us of the issue(s) desired and include  
 \$2 per issue desired in a check or money order or by credit card.  
 (Minimum credit card order is \$9.) No shipping charge in U.S. and Mex-  
 ico; Texas residents add 7.5% sales tax. Shipping charge of 30 cents per  
 issue to Canada. For other foreign delivery, add 50 cents per issue sur-  
 face mail, \$2 per issue air mail. No discounts on orders of sets. All prices  
 U.S. funds.

OUT OF STOCK: Vol 1, nos. 1-2, Vol 2, no. 1

## Miscellany

TI-Forth Disks (2 disks, program and demo disks, no manual).....\$6.00  
 MICROpendium Index (2-SSSD disks, XBASIC required).....\$5.00  
 Disk of programs from one issue of MICROpendium (must be a subscriber  
 to order).....\$4.00  
 12 monthly disks of programs appearing in each edition of MICROpendium  
 (must be a subscriber to order/starts with April 1989).....\$40.00  
 Magazine holders (12/set-add \$1 shipping/order).....\$3.00

Send name, address, product(s) ordered, check, money order or  
 Visa/MasterCard number and expiration date (\$9 minimum on credit card  
 orders \$9) to: MICROpendium, P.O. Box 1343, Round Rock, TX 78680.  
 (Foreign orders write for postage fees.)

## Tell us about it

Please let us what columns or features you like the most  
 about MICROpendium. Rank your selections in order of  
 preference using this form. Return it to us when you renew  
 your subscription.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

Other suggestions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Send me the next 12 issues of MICROpendium. I am  
 enclosing \$ \_\_\_\_\_ in a check or money order in U.S.  
 funds. Or bill my ☐ ☐ ☐ ☐ (Check one)

Exp. Date \_\_\_\_\_

Card No. \_\_\_\_\_

Minimum credit card order is \$9

Signature \_\_\_\_\_

(required on credit card orders)

Mail to: MICROpendium, P.O. Box 1343, Round Rock, TX 78680

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ ZIP \_\_\_\_\_

The numbers on the left of your mailing label indicates the cover date  
 of the last issue on your subscription.

v6,n5

SECOND CLASS